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Novel Methods of Extinguishing Fires.

The engravings represent an apparatus for extinguishing fires, which was proposed in 1865 by David F. Masnata, a resident of the island of Cuba. They show a vertical section of the device and also one method of its application.

The cylinder, A, is of sheet-metal, in this case provided with trunnions, B, and mounted on a movable frame having wheels or trucks by which it can be moved from place to place. Or it may be slung by straps to a man's shoulders and operated while in this position, as shown in the larger engraving.

The cylinder is furnished with a cover which fits air-tight and may be secured in this position, while danger from over-pressure is obviated by means of a safety valve on its top. Suspended in the center of the cylinder is a tube, C, of lead while D is a lead pipe and stop-cock projecting from near the bottom and having a hose and nozzle attached.

In preparing the apparatus for use the cover is opened and a quantity of marble dust or other cheap carbonate is introduced, when the vessel is nearly filled with water. The cover is then secured and the center plug opened through which a quantity of sulphuric or other acid is poured into the tube. In case of a fire the cylinder is tilted so that a portion of the acid is mingled with the water, and by its action on the carbonate, carbonic acid is evolved and exerts a pressure on the water sufficient to project a small stream to a considerable distance.

Mr. Masnata's address is to the care of the Spanish Consul, No. 29 Broadway, New York City.

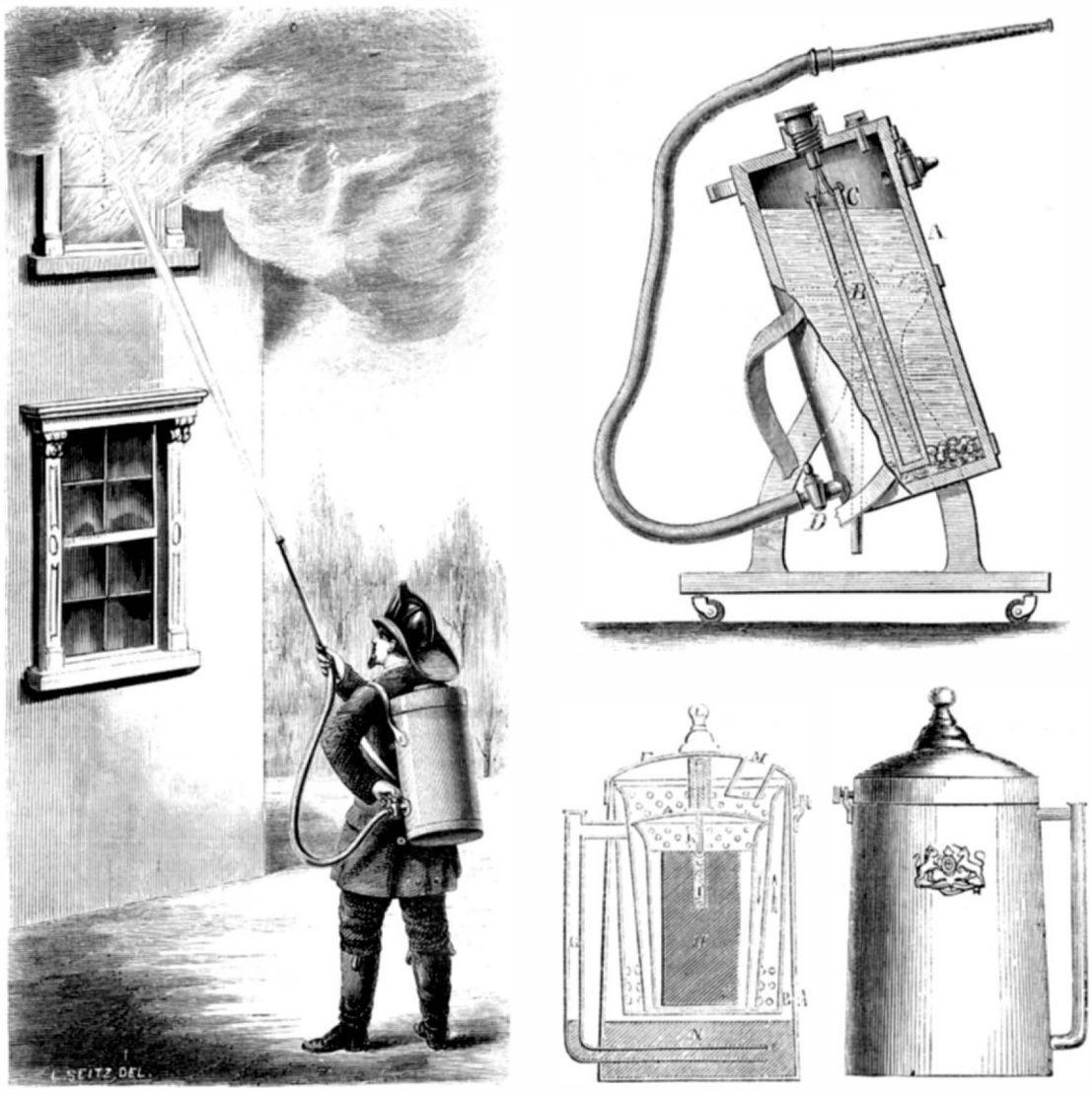
An apparatus of a somewhat similar character was severely tested on Monday, the 14th inst., before a committee of the Metropolitan Fire Department at Jones's Wood, this city. The experiments seemed to demonstrate the value of this portable extinguisher as a ready means to subdue a fire in its first stages, and even after it had assumed considerable proportions. The water in the cylinder of this device becomes charged with carbonic acid gas, and in this condition, it is claimed, may be kept for any length of time without deterioration, and yet is ready for use whenever required. Its effects on a fire, whatever the nature of the combustibles, are almost instantly apparent. Burning coal tar, animal, and even kerosene oils were extinguished with the greatest ease. A small building of wood, ten feet square, was erected and set on fire. After the flames had completely enveloped the structure, the operator, with an extinguisher on his back, advanced and begun to play upon the fire. In less than five minutes the flames were subdued.

The apparatus occupies scarcely more space than a water bucket and is said to be always ready for service although standing unused for years. The Levey Brothers, licensees of Baraguanath & Van Wisker, the patentees, conducted the experiments. Their office is 58 Nassau street, this city, and we presume they are ready to give all information desired by persons interested.

These experiments remind us of the Phillips Fire Annihilator, exhibited in various parts of the country in 1851, and illustrated in the SCIENTIFIC AMERICAN, Vol. VII., No. 1. We reproduce as a curiosity two of the engravings then used which represent the small hand machine. It consisted of two outer cases, A and B, of metal with a chamber, N, containing water. G is the discharge pipe. H is a chemical composed of wood, charcoal, coke, common saltpeter, plaster of Paris, and size, ground fine, mixed, and molded into blocks. I is a glass tube inserted into the charge and containing sulphuric acid. The charge was ignited by the rod, K, which shivered the glass and freed the acid. Vapor or gas was instantly evolved and projected with considerable force on the flames. The apparatus was not, however, very successful.

In No. 6 of the same volume (Oct, 25, 1851), we published an engraving of a steam fire engine a part of the description of which was as follows:—"When the engine is standing in the house, the boiler always contains a sufficient quantity of water to get up steam, and at the same time is charged with carbonic acid gas by suitable apparatus, until it contains sufficient to work the engine for ten minutes in which time steam can be raised to take its place, when exhausted." Our firemen now would think such a machine rather old-fogyish, as they consider less than half that time sufficient to get up steam on their engines.

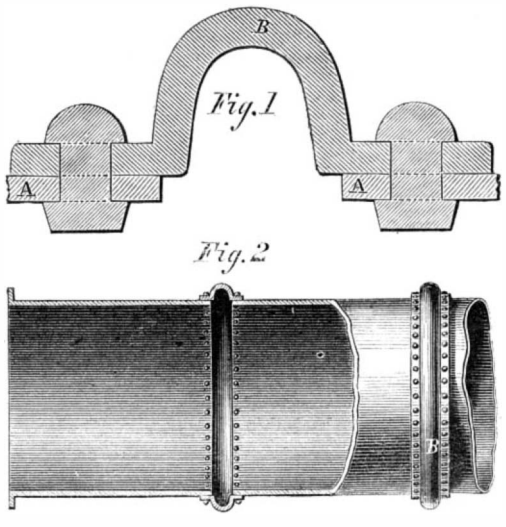
Whether either of these devices or any other by which fires are attempted to be extinguished by chemical mixtures will ever supersede the use of water alone, may be doubtful, but that the attention of inventors is directed to this object is gratifying. In a city so crowded as is the metropolis a handy and efficient means of quenching fires in their incipiency should be attached to every building, and especially to our tenement houses swarming with human life. The Legislature should compel the adoption of some proper apparatus.



FIRE-EXTINGUISHING APPARATUS.

IMPROVED JOINT FOR BOILER FLUES.

The internal flues of boilers are sustained only by the ends, with, in some instances, stays to brace them. Their weight exerts an enormous strain upon the boiler heads to which they are attached, and it is well understood by engineers that the flues of horizontal boilers constitute the weakest element in their construction.



We copy from *Engineering* a new joint for boiler flues introduced by the Bowling Iron Company. In the engraving, A is the barrel of the flue, and B, the ring joint. From the section Fig. 1, it will be seen that this form of joint gives extraordinary stiffness, while at the same time it imparts to the flue a certain amount of longitudinal elasticity to allow for expansion, and thus reduces the strain upon the end plates. These hoops are rolled of any required diameter without weld.

MODEL MAKING.

The demands of inventors, in order to conform to the requirements of the Patent Office, have developed, within a few years, a department of mechanics not before separated from the ordinary business of the common machinist. But the business of the model-maker has now become as distinct from that of the machinist and cabinet-worker as theirs are from that of the forger and the carpenter. None but first-class mechanics can hope to become successful model-makers. The work required is generally exact, fine, and perfect. Working models, where practicable, are preferred, and the model-maker must use as much judgment in the construction of the model as the engineer or machinist in building the working machine, while he must almost equal the watchmaker in closeness of work and skill in manipulation.

A fine working model is a thing of beauty, and next to the full-sized working apparatus is a delight to the mechanical eye, while a botched-up job is an eye-sore. We feel a pride in the inspection of a well-made model, and many of them come under our notice in our professional labors. We feel a pride in the art with which we know ourself to be allied by taste and profession. It is pleasant to see the efforts of boys of a mechanical turn, who usually attempt the construction of a miniature machine, sometimes with the poorest tools and of the most unsuitable materials, but not seldom with splendid success.

Model making affords a pleasant branch of occupation to those mechanics who, possessing naturally fine tastes and an acquired dexterity of manipulation, recoil from the heavy, rough work of the engine builder. They not unfrequently make improvements in tools and processes and serve well their day and generation. Their work is at the same time a pleasure, not laborious or necessarily dirty, and affording an agreeable variety. Some specimens of their handiwork are as much monuments to their ingenuity and patience as is the marine engine to the comprehensive genius of the engineer.

A TRULY AMERICAN IDEA.

If any American yet lives in ignorance of the triumph of scientific American skill in the manufacture of watches, he should be advised to provide himself with the information, in the form of a Waltham watch, at his earliest convenience. Meanwhile, a glance at the testimonials presented on one of our advertising pages, will be instructive. Every one knows, of course, that we have no labor in this country, skilled or otherwise, which will consent to compete in cheapness with that of Europe. How then is a watch, almost the whole cost of which is in labor, to be produced here in its perfection at once better and cheaper than it can be imported? The problem was solved, as many another of the same kind has been, by the application of exact science and inventive genius. To make machinery for the production of every piece required, in perfect proportion and finish, was the initial labor, which once done was done always, instead of being to do anew on every watch, as in the hand-made work of European manufacturers. Hence the Waltham watches are precisely alike, after each kind; and since their parts could be interchanged without difficulty, it follows that they must run together as accurately as they are adapted to each other, and may be, as they are, warranted with entire certainty. Nothing was ever more successful, as a scientific or a business effort. The works now cover three acres, and employ a thousand operatives. It is estimated that the American Watch Company, which commenced business ten years ago, make nearly half the watches sold in the United States.

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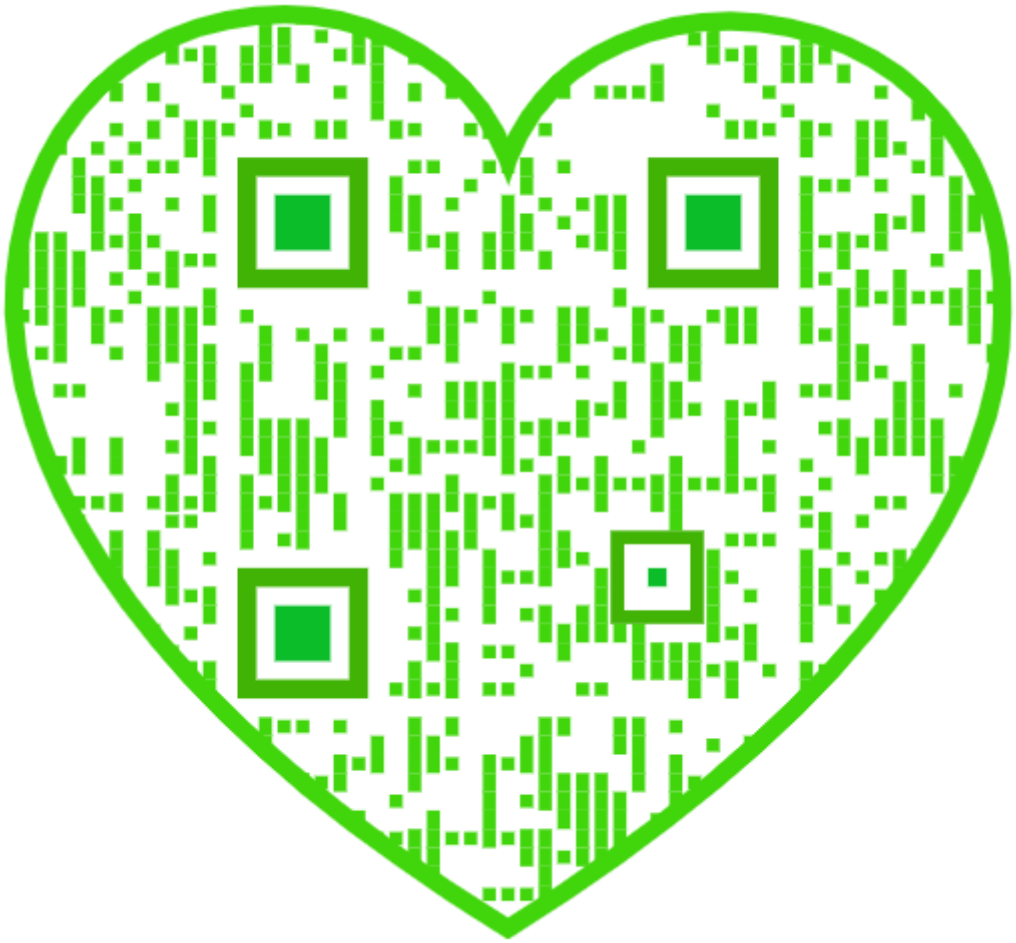

A NATURALIST'S HOME.

There is no place like England for a rich man to live in exactly as he pleases. It is the appropriate exercising ground for the hobbies of all mankind. You may join an Agapemone, or you may live alone in dirt and squalor, and call yourself a Hermit. The whim of the late Charles Waterton, naturalist, was a very innocent one, namely, to make his home a city of refuge for all persecuted birds, a sanctuary inviolate from net and snare and gun; and he effected his humane purpose. An intimate associate and fervent admirer of his, one Dr. Richard Hobson, has given to the world an account of this ornithological asylum; and it is certainly very curious. The name of the place was Walton Hall, near Wakefield; and it seems to have been peculiarly well adapted for the purpose to which it was put. It was situated on an island, approachable only by an iron footbridge, and having no other dwellings in its immediate neighborhood. The lake in which it stood gave the means of harboring waterfowl of all kinds, while the "packing" of carrion crows in the park exhibits a proof of the protection afforded by even the mainland portion of the estate; it was sufficiently extensive to allow of portions being devoted to absolute seclusion, for those birds which are naturally disposed to avoid the haunts of man. "Two-thirds of the lake, with its adjacent wood and pasture land, were kept free from all intrusion whatever for six successive months every year; even visitors at the house, of whatever rank, being 'warned off' those portions set apart for natural history purposes. Even the marsh occupied by the herons was forbidden ground throughout the whole breeding season, unless in case of accident to a young heron by falling from its nest; in which case aid was afforded with all the promptitude exhibited by the fire-escape conductors for the safety of human life."

The surroundings of the mansion itself were quaint and exceptional, exhibiting the eccentric character of their proprietor. Item, a magnificent sun dial—constructed, however, by a common mason in the neighborhood—composed of twenty equilateral triangles, so disposed as to form a similar number of individual dials, ten of which, whenever the sun shone, and whatever its altitude, were faithful timekeepers. On these dials were engraved the names of cities in all parts of the globe, placed in accordance with their different degrees of longitude, so that the solar time of each could be simultaneously ascertained. Near this sun dial was a subterraneous passage leading to two boat houses, entirely concealed under the island, furnished with arched roofs lined with zinc plate, and arrangements for slinging the boats out of water when they required painting or repair.

Four sycamores with roosting branches for pea hens, and a fifth, whose decayed trunk was always occupied by jackdaws, screened the house from the north winds. Close to the cast-iron bridge entrance was a ruin, on the top of whose gable, at the foot of a stone cross twenty-four feet above the lake, a wild duck built her nest, and hatched her young for years. A great yew fence enclosed this ruin on one side, so that within its barrier birds might find a secure place for building their nests and incubation. For the special encouragement and protection of the starling and the jackdaw, there was erected within this fence a thirteen feet high stone and mortar built tower, pierced with about sixty nesting berths. To each berth there was an aperture of about five inches square. A few, near the top, were set apart for the jackdaw and the white owl. The remaining number were each supplied at the entrance with a square loose stone, having one of its inferior angles cut away, so that the starling could enter, but the jackdaw and owl were excluded. The landlord of these convenient tenements only reserved to himself the privilege of inspection, which he could always effect by removing the loose stone.

The lake had an artificial underground sluice, which issuing out at a little distance into sight, furnished the means of cultivating a knowledge of the mysterious habits of the water rat; this stream then passed through one of the loveliest grottos in England. Near this place were two pheasantries, the central portion of each consisting of a clump of yew trees, while the whole mass was surrounded by an impenetrable holly fence; the stable yard was not far off; and hence the squire had infinite opportunities of establishing the important fact, as he considered it, that the game cock always claps his wings and crows, whereas the cock pheasant always crows and claps his wings. Mr. Waterton's interest in natural history was, however, by no means confined to the animal creation. He concerned himself greatly with the culture of trees (though by no means of land), and hailed any *lusus naturæ* that occurred in his grounds as other men welcome the birth of a son and heir. Walton Hall had at one time its own corn mill, and when that inconvenient necessity no longer existed, the millstone was laid by in an orchard, and forgotten. The diameter of this circular stone measured five feet and a-half, while its depth averaged seven inches throughout, and its central hole had a diameter of eleven inches. By mere accident, some bird or squirrel had dropped the fruit of the filbert tree through this hole to the earth, and in 1812 the seedling was seen rising up through that unwonted channel. As its trunk gradually grew through this aperture and increased, its power to raise the pondrous mass of stone was speculated upon by many. Would the filbert tree die in the attempt? Would it burst the millstone? Or would it lift it? In the end, the little filbert tree lifted the millstone, and 1863 wore it like a crinoline about its trunk, and Mr. Waterton used to sit upon it under the branching shade. This extraordinary combination it was the great naturalist's humor to liken to John Bull and the national debt.

In no tree fancier's grounds were there ever one tenth of the hollow trunks which were to be found at Walton Hall; the fact being, that the owner encouraged and fostered decay for the purposes of his birds' paradise. These trees were protected by artificial roofs in order to keep their hollows dry, and fitted thus for the reception of any feathered couple inclined to marry and settle. Holes were also pierced in the stems, to afford ingress and egress; and one really would scarcely be surprised if they had been furnished with bells for "servants" and "visitors." In an ash tree trunk thus artificially prepared, and set apart for owls (the squire's favorite bird), an ox-eyed titmouse took the liberty of nesting, hatching and maturing her young. Mr. Waterton attached a door, hung on hinges, to exactly fit the opening in the trunk, having a hole in its inferior portion for the passage of the titmouse. The squire would daily visit his little tenant, and opening the door, delicately drew his hand over the back of the sitting bird, as though to assure it of his protection. But unfortunately, after the bird had flown, one year, a squirrel took possession of this eligible tenement, and although every vestige of the lining of its nest was carefully removed, no titmouse or any other bird ever occupied it again.

In May, 1862, the squire pointed out to the author no less than three bird's nests in one cavity—a jackdaw's with five eggs; a barn owl's with three young ones, close to which lay several dead mice and a half grown rat, as in a larder; and, eighteen inches above the owl's nest, a redstart's containing six eggs! Our author deduces from this circumstance, that in an unreclaimed state, birds, although of different species, are not disposed to quarrel; and the fact that near this "happy family" a pair of water hens hatched their eggs in a perfectly exposed nest, under the very eyes of two carrion crows who occupied the first floor of the same tree, an alder, without the least molestation, seems to confirm this view.

In this Garden of Eden, however, all sorts of anomalous things seem to have been done by birds. In a cleft branch of a fir tree, twenty-four feet from the ground, a peahen built her nest, through which piece of ambition, since falling is much easier to learn than flying, she lost all her young ones. In the branch of an oak, twelve feet from the ground, a wild duck nested, and brought down all her brood in safety to their natural element. A pair of coots built their nest on the extreme end of a willow branch closely overhanging the water; but the weight of the materials, and especially of the birds themselves, depressed it so that their habitation rested on the very surface of the water, and its contents rose and fell with every ripple; and, finally, another pair of coots who had built their house upon what they considered *terra firma*, found themselves altogether adrift one stormy morning, and continued so, veering with the fickle breeze for many days, until at last the eggs were hatched, and their young family became independent, and could shift for themselves. All these minutiæ were carefully watched by the squire. An excellent telescope enabled him to perceive from his drawing room window the manœuvers of both land and water fowls. "You could carefully scrutinize their form, their color, their plumage, the color of their legs, the precise form and hue of their mandibles, and not unfrequently even the color of the iris of the eye: also their mode of walking, of swimming, and of resting. You could distinctly ascertain the various kinds of food on which they lived and fed their young. You could see the herons, the water hens, the coots, the Egyptian and the Canada geese, the carrion crows, the ringdoves (occasionally on their nests), the wild duck, teal, and widgeon." No less than eighty-nine descriptions of land bird, and thirty of water fowl, sojourned in the grounds or about the lake of Walton Hall. In winter, when the lake was frozen, it was literally a fact that the ice could sometimes not be discerned, it was so crowded by the thousands of water fowl that huddled together upon it without sound or motion.

Mr. Waterton, it may be easily imagined, was himself no sportsman; but it was his custom to supply his own table on a fast day (he was a Roman Catholic) with fish shot by himself with a bow and arrow. Otherwise, he made war on no living creature, except the rat: the "Hanoverian" rat, as he designated him with bitterness: and even him he preferred to exile rather than destroy. On his return home from his famous wanderings in South America, he found the hall so infested with rats that nothing was safe from them. But having caught a fine specimen of the "Hanoverian" in a "harmless trap," he carefully smeared him over with tar, and let him depart. This astonished and highly-scented animal immediately scoured all the rat passages, and thus impregnated them with the odor of all others most offensive to his brethren, who fled by hundreds in the night across the narrow portion of the lake, and were no more seen. Though very bigoted in religious matters, the squire was indeed a most tolerant and tender-hearted man. He built a shelter upon a certain part of the lake expressly for poor folks, who were permitted to fish whether for purposes of sale or for their own dinners; and notwithstanding that it was his custom to dress like a miser and a scarecrow, and to live like an ascetic, sleeping upon bare boards with a hollowed piece of wood for a pillow, and fasting much longer than was good for him, he was very charitable and open handed to others.

It must be confessed, however, we gather from this volume that the great naturalist was, out of his profession, by no means a wise man, and certainly not a witty one. He loved jokes of a school boy sort, and indulged in sarcasms more practical than delicate. The two knockers of his front door were cast, from bell metal, in the similitude of human faces, the one representing mirth, and the other misery. The former was immovably fixed to the door, and seemed to grin with delight at your fruitless efforts to raise it; the latter appeared to suffer agonies from the blows you inflicted on it. In the vestibule was a singularly conceived model of a nightmare, with a human face, grinning and showing the tusks of a wild boar, the hands of a man, Satanic horns, elephant's ears, bat's wings, one cloven foot, one eagle's talon, and with the tail of a serpent; beneath it was the following motto:—

Assidens præcordiis
Pavore somnos auferam.

It was his humor, more than once, when between seventy and eighty years of age, to welcome the author, when he came to dinner, by hiding on all fours under the hall table, and pretending to be a dog. He made use of his wonderful taxidermic talents to represent many individuals who took a leading part in the Reformation by loathsome objects from the animal and vegetable creation, and completed the artistic group with a sprinkling of "composite" demons. He was seriously vexed, and behaved very rudely to a stranger under his own roof, who had profanely designated his favorite (stuffed) Bahia toad as "an ugly brute."

These and similar instances of bad taste we think Dr. Hobson might have left unrecorded with advantage. Still, there was much to like as well as to admire about the great Naturalist. No museum of natural history elsewhere could compare with the beauty and finish of the specimens, prepared by the squire's own hand with wonderful skill and patience, which adorned the inside of Walton Hall. "Not even living nature," says our author, "could surpass the representations there displayed." In attitude, you had life itself; in plumage, the lustrous beauty that death could not dim; "in anatomy, every local prominence, every depression, every curve, nay, the slightest elevation or depression of each feather." The great staircase glowed with tropic splendor. At the top of it was the vertical cayman mentioned in the Wanderings, on which the squire mounted in Essequibo, and the huge snake with which he contended in single combat. Doubts have been thrown on both these feats, but Dr. Hobson relates instances of presence of mind and courage shown by the squire in his own presence, quite as marvelous as these. Wishing to make experiment as to whether his Woorali poison, obtained in 1812 from the Macoushi Indians, was more efficacious than the bite of the rattlesnake, he got an American showman to bring him twenty-four of these dangerous reptiles, and took them out of their cases, one by one, with his own hand, while the Yankee fled from the room in terror, accompanied by very many members of the Faculty, who had assembled to witness the operation. In his old age, he alone could be found to enter the cage of the Borneo orang-outang at the Zoological Gardens, in order minutely to inspect the palm of his hand during life, and also the teeth. It was with difficulty he obtained permission to run this hazard, the keepers insisting upon it, that the beast would "make very short work of him." However, nothing daunted, the squire entered the palisaded enclosure. "The meeting of these two celebrities was clearly a case of love at first sight, as the strangers embraced most affectionately, kissing one another many times, to the great amusement of the spectators. The squire's investigations were freely permitted, and his fingers allowed to enter his jaws; his apeship then claimed a similar privilege, which was courteously granted after which the orang-outang began an elaborate search of the squire's head."

The strength and activity of Waterton were equal to his physical courage, notwithstanding that he was wont to indulge in venesection to a dangerous extent, always performing that operation himself, even to the subsequent bandaging. At eighty-one, the suppleness of his limbs was marvelous; and at seventy-seven years of age our author was witness to his scratching the back part of his head with the toe of his foot! Death, however, claimed his rights at last in the squire's eighty-third year.

Charles Waterton lies buried in a secluded part of his own beautiful domain, at the foot of a little cross with this inscription written by himself,—

Orate
Pro anima Caroli Waterton,
Viatoris:
Cujus jam fessa,
Juxta hanc crucem
Hic sepeliuntur ossa.

Even those iron limbs of his grew weary and he died.—*Chambers Journal.*

HARD RUBBER TYPE is said to be manufactured at Dalston, England, at one-third the cost of metallic type and of equal durability.

PURE SAND, such as is used on floors, should be employed by benevolent people instead of ashes, on slippery sidewalks. Ashes make a sticky, uncleanly paste while wet, and return in fine corrosive dust to lungs, garments and goods, when dry.

SMALL SAVINGS.—The parings of a bushel of juicy apples are said to yield a quart of cider by the aid of a hand press. The honey that wastes its sweetness on the air around an acre of buckwheat in blossom, can be saved to the amount of fourteen pounds per day, according to the estimate of a German investigator. Rags can be saved to the value of $60,000,000, as shown by the paper statistics of this country alone.

WET SEASONS.—The usual impression that wet seasons are unhealthy, is contradicted on the authority of compared meteorological and medical records, showing that the more rain the fewer deaths, and *vice versa*. Intermittent fevers in malarious localities have been observed to prevail worse in dry than in wet seasons. Diarrhea and cholera are asserted to follow the same law. What say the doctors? If their proverbial diversity cannot yield us at least three contradictory opinions on this question, we shall have made a remarkable approximation to definite assurance.

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Editorial Summary.

SLAUGHTER PITS.—The Collieries of England sacrifice nearly one thousand lives outright every year, not to speak of the shortening of life by an unhealthy subterranean occupation. The late explosions at Barnsley, destroying some 425 lives, were by far the most destructive on record. Experience, science and legislative authority seem to have exhausted their resources in the ineffectual endeavor to cope with the subtle and invisible foe which prevades all the cavities of a coal so abundant in hydrogen as that of England. Sir Humphrey Davy's safety lamp, (covered with a wire gauze through which air and light, but not flame, can be communicated) has been in use over half a century; yet only the ratio, hardly the aggregate, of violent deaths in coal mines, has been diminished. As long as mankind are fallible—and the most prudent are liable to be off their guard at some fatal moment—the safety lamp must remain but a partial protection. Still the problem has not been given up, and undoubtedly the parliament at its next session will make a fresh effort to bring invention to the rescue. Some mechanical means of removing, or some chemical means of indicating or neutralizing the explosive gas—explosive when mingled with air—is now earnestly sought. It would seem, however, that ventilation, even if perfected so as to obviate the accumulation of the gas, must be powerless against its sudden irruption from concealed reservoirs.

NUTRITION OF THE TEETH.—Dr. Henry S. Chase, in the *Medical Investigator*, estimates that a mother and child under eighteen months, together require for the nutrition of the dental and osseous systems, 55 grains per day of phosphate of lime for the former, and 27 grains for the latter. These 87 grains, he says, are contained in 10 ounces of cheese, in 31 ounces of peas, in 35 ounces of fresh mutton, beef or unbolted wheat flour, or in *one hundred and seventy-five* ounces (nearly 11 pounds) of fine flour, such as we commonly use—enough to make a dozen loaves of baker's bread of the largest size. Think of a woman eating a dozen of those loaves daily to sustain the osseous system! It is consoling that bread is a minor item in the diet of most persons. Want of backbone or any bone at all would result from a diet of fine wheaten bread, if these calculations are not at fault somewhere. Living on "bread and butter" of this sort is too common, however, among the women and children of America. There is a "fatal facility" about it. We must have a new "staff of life" with more bone in it, and equally handy.

WINTER GARDENS may be made with beautiful effect in front of dwellings, by a tasteful arrangement of evergreens in parterres, having regard to the varieties and contrasts in their shades of color, forms and sizes. The *Prairie Farmer* suggests the following arrangement:—A group of three or more of the upright junipers, from three to four feet high, in the center, and one of these decidedly taller than the rest. Around these a single row of low Canada balsams, taking the form of the bed, but not crowded too closely. Outside of the balsam a row of arboritæs, or a ring of snug little red cedars, very compact and low. Next a circle of bear grass, with its long pointed leaves, so as to make a continuous band of their pale green. Here, Lastly a prostrate broad-leaved evergreen, the vinca minor, often called the ground myrtle will come in as a fine contrast.

CHEAP SOURCE OF OXYGEN.—Highly oxygenated compounds such as the chromates and manganates, can be partially deprived of oxygen by steam, for which they immediately compensate themselves from the air. A method has been patented in France for making this process continuous, and thus drawing a steady supply of oxygen from the atmosphere. A current of steam is passed through a retort containing one of these compounds, and carries off with it a current of oxygen, which is collected in a gas holder where the steam is condensed to water. Following this, a current of hot dry air is passed through the retort and re-oxygenates the compound, which is then ready to yield again. An improvement of the apparatus so as to de-oxygenate and re-oxygenate simultaneously, would seem to be desirable.

IRRIGATION.—Over a million acres of land, in the counties of Fresno, Merced, Stanislaus and San Joaquin, Cal., are to be reclaimed by artificial irrigation. A Stockton paper states that a San Francisco Company have surveyed the work, and will commence early in the spring a canal that is to bring a perpetual and abundant supply of water from Tulare Lake, through a level country requiring no locks or aqueducts, at once irrigating the land and forming a highway that will convey the products of the whole region to the San Francisco market. It is supposed that it will be the cheapest canal ever built.

IT is said that Wm. H. James, who is reported to have been the inventor in 1820 of tubular boilers, is living in England at the age of seventy years in abject poverty. It was ascertained that he had been living without food for several days and had supported existence for a year by pawning his clothes, tools, and furniture. A subscription was started for his relief which promises to place him beyond future want.

THE largest anchor in the world, according to Chas. Ryland's *Iron Trade Report* has lately been finished at H. P. Parkes' Works, Tipton, Staffordshire. It is intended for the *Great Eastern* and weighs eight tuns exclusive of the stock. Its dimensions are; length of shank, twenty feet six inches; of woodstock nineteen feet six inches; trend of arms seven feet four inches. It is somewhat different in form from ordinary anchors, the palms or blades being divided or split so that it may more readily pierce the sea bottom.

CAPTAIN NORTON'S INVENTIONS.—In response to the demand for evidence of his priority in the invention of improved shot, Capt. Norton favors us with an extract from the *United Service Gazette* of Dec. 8, 1866, being a statement under the name of "Richard Airey, Quartermaster General," dated Horse Guards, 22d June, 1860, to the effect that when quartered with him at Woolwich, in 1823, Capt. Norton invented and exhibited an elongated expanding shot and shell, identical in principle with the present Minie bullet, of which he (Airey) frequently witnessed the operation at that time.——For armor-penetrating shot, Capt. Norton asserts that a flat-headed bolt is preferable to the ogival form, and this was known and acted on by the old British archers. In 1827, he pierced with a flat-headed bolt a guardsman's cuirass which had resisted an ogival-headed bolt, both being of steel. Allowing these facts, Government trials, however, have resulted in the rejection of this form for cannon shot, as it breaks on heavy armor instead of penetrating, and is subject also to deviation.

GOVERNMENT ITEMS.—The conversion of Springfield muskets into breech-loaders has been commenced at the armory, at the rate of 50 per day. Martin's new "central-fire cartridge" is to be the ammunition; the advantage being that the anvil on which the fulminate rests is not blown out by the explosion, but remains in the shell.—The House Post-office Committee are reported to be in favor of the telegraphic post-route scheme. The question is now upon buying or leasing old lines, or constructing new. The Postmaster General is in favor of the latter.—A further appropriation is asked, and will probably be granted by Congress, to carry out the plans of the New York Commissioners relative to the representation of our country in the Paris Exposition.—The New York Post-office bill has passed both houses of Congress.

THE CRANMER MACHINE GUN.—This appears, as described in the local papers, to be a California product. It is said to be capable of throwing 6¾ tons of half-ounce bullets in twenty-four hours, with the force of the ordinary rifle. This would be rather a useless operation, but we are permitted to infer that the machine could discharge 300 such shots per minute, which would be something to the purpose. It is operated by a crank, like the successful Gatling gun, and claims the usual advantages of simplicity and exemption from derangement—usual in claims, but rarest of all things in fact. We have no doubt that hand shooting will eventually be superseded by machine shooting, precisely as steam printing has taken the place of hand presswork: i. e., for all except fine work and small jobs.

COTTON AND CORN.—The official estimate for 1866, is 1,750,000 bales of cotton, of 400 lbs. each, or a million and a half of the actual size. This makes 750,000,000 lbs. The largest product is that of Texas, 300,000 bales. Mississippi follows with 270,000 bales; Alabama, 220,000; Georgia, 205,000; Arkansas, 182,000; Tennessee, 148,000; Louisiana, 109,000; South Carolina, 102,000; North Carolina, 91,000; Florida, 36,000; other States, 67,000. The corn crop of 1866, is estimated at 880,000,000 bushels. A diminution appears in the product of 22 Northern States, (679,000,000) of 25,000,000 in quantity and the equivalent of 75,000,000 in quality. The 11 lately insurgent states return 185,000,000 bushels against 274,000,000 in 1859, the year last reported.

BREECH LOADERS FOR THE NEW YORK MILITIA.—The State Board of Officers for the examination of improvements in breech-loading small arms, and particularly methods of converting muzzle-loaders, reconvened at the State Arsenal on the 22d January. The following officers comprise the board: Brig.-Gen. Geo. W. Palmer. Commissary General of Ordnance Brig.-Gen. Wm. G. Ward, commanding First Brigade National Guard; Col. Geo. M. Baker, commanding Seventy-fourth Regiment National Guard; Col. Silas W. Burr, Assistant Inspector General.

THE population of London is gradually decreasing. This may be a startling assertion, but nevertheless it is true. The last census shows that the city proper numbers only 100,000 actual residents, and this number is diminishing, dwellings being displaced by warehouses. The solid men who give the city its importance are nearly all non-residents. The actual population is largely composed mainly of the working classes and those in the humbler walks of life, and constitute but forty per cent of the number of persons who transact business there. The city of London proper is not much of London after all. Its surroundings countmillions.

THE PARISIAN COSTAR.—The rat exterminators of France have a unique mode of advertising the merits of their preparations. We learn that a singular equipage consisting of a van covered all over with dead rats, to the number of more than 500, has been creating a sensation in the streets of Paris. These animals were victims to a new process invented by M. Bergeot, of Orleans, a noted destroyer of rats, who has acquired a great reputation from the immense number he has killed at Marseilles and Havre.

THE TROY MAMMOTH.—The remains of the mastodon ex cavated a month or two since near Cohoes, have been presented by Mr. Alfred Wild, to the New York Cabinet of Natural History, and have been deposited in the State Geological Museum. As the fossils show a tendency to crumble, they must be treated with oil for some months before being placed on public exhibition.

FRENCH MEASURES. — The decimeter (one tenth of a meter) is five times the diameter of our new five-cent piece or 3.83 inches. The weight of the piece is exactly five French grammes.

EFFECT OF VIBRATION ON IRON.—The theory that wrought iron loses its tenacity by crystallization, in consequence of long-continued vibratory shocks, was suggested by the appearance of many rails and axles, which had given way, and confirmed by the analogy of the supposed cause and effect to percussion and its results. At length, this theory has been impugned by a machinist in Berlin, who has observed the same crystallized condition in bars that had failed without having been subjected to vibration, and has produced in his experiments fractures by protracted vibration (if we understand him) without the exhibition of crystallization. Hence he infers that the crystallization so generally if not universally observed in broken railroad axles, probably existed as an original defect in the iron. A more improbable supposition than this can hardly be entertained, and it will require far more conclusive evidence than we have seen to commend it to belief. The subject, however, is worthy of more exact investigation than it has received.

ICE FOR EUROPEAN CITIES.—The glaciers of the Alps are now mines of wealth and tributaries to luxury—inexhaustible in both respects. They are worked (says Dr. Prime) precisely like stone quarries and their product is transported by rail to Paris and other continental cities. Not only so, but they are excavated into galleries, chambers, and magnificent saloons. The depths of snow on the surface exclude the sunbeams, but calcium lights shed a brilliant lustre reflected as from a thousand mirrors of glass, and, in small apartments fitted up for the purpose, the furniture of a well-appointed parlor invites to cool but not inhospitable repose."

GOLD IN OHIO.—The Irish proverb "there's paraties every where," will probably come to be applied to gold. In the vicinity of Belleville, Ohio, gold has lately been discovered in minute grains and flakes in the sand. The "placer" has been purchased, and a company has been organized to work it.

ECONOMY OF CHEESE FACTORIES.—A Canada cotemporary supplies data from the books of the West Oxford Cheese Factory as follows:—R. A. G. supplied 101,331 lbs. of milk from 32 cows, from May 7th to Oct 12th, for which he realized $1,064; a return of $33 25 or 21½ cents per day from each cow. J. G. supplied 80,959 lbs. of milk from 26 cows, realizing $849 or $32 69 per cow, for the same period. The price realized for the milk was about 1 1/10 cents per lb. A quart of rich milk weighs about 2¼ lbs., hence the price obtained per quart was a little less taan 2½ cents.

CAR FERRY.—A powerful iron railroad steamer, to carry trains of cars in the manner proposed between Dover and Calais, has been running between the respective termini of the Michigan Central and Great Western Railroads, at Detroit and Windsor (C. W.), since January 1st. She takes eight cars and their contents, without "breaking bulk," and is built to break her way through the ice whenever necessary.

The Unit of Heat.

Two distinct units of heat have been proposed and are in use. First, the quantity of heat which is required to raise the temperature of one gramme of water 1° cent. Second, the quantity of heat required to raise the temperature of one pound of water 1° Fah. These are very far from having an equal value. By the combustion of 1 gramme of carbon 8,000 grammes of water may be heated 1° cent.; and also it is evident that 1 lb. of carbon will heat 8,000 lbs. of water 1° cent. In other words any given weight of combustible will raise the temperature of the same weight of water an invariable number of degrees. Thus tables of heating values of substances will be composed of the same numbers, whether representing grammes, pounds or any other weights, provided that the same thermometric scale be followed. A change of the thermometric scale requires however a change of all the numbers of the tables to correspond with the difference of value of the degrees.—5° cent.=9° Fah. or 1° cent. =9/5° Fah. and 1° Fah.=5/9° cent. To reduce a cent. table therefore to the Fah. multiply all the numbers by 9/5. Thus the heating value of carbon is 8,000 units by the Cent. scale and 14,400 by the Fah. scale.

This difference of scales has been the source of a considerable confusion in discussions on heat. English writers are obliged to use both scales and thus are in great danger of mixing them up. Inconsistencies on this account may be found in some of our best books. I make these statements in order that I may claim a little sympathy on account of a mistake, I made last week in my calculation on the "Clash of Atoms." I stated the heat value of carbon to be 8,000 units, which was correct enough by the centrigrade scale, but what I needed was the number 14,400, which represents the units by the Fah. scale. Thus it will be seen that my great figures were far too small. I regret it, for I fear that their very greatness will bring doubt on the beautiful theory of the "Clash of Atoms." CHARLES A. SEELY.

Ice Boat Race.

Two of the Poughkeepsie ice boats (*Haze* and *Snow Flake*) ran on the 15th of Jan. from Poughkeepsie to Newburgh, as a reconnoissance for the proposed regatta. The time made was fifty miles per hour, on very rough ice. The *Snow Flake* plunged through the drifts and crashed over the "hummocks" with full mainsail, at a fearful rate, beating her companion four miles. Afterwards in crossing the river at the rate of a mile a minute, the *Snow Flake* had her whole standing rigging raked off in an instant by a shake of wind, the party on board being all luckily to windward and so escaping injury. —A sleighing race for a purse of $1,000, was run the same day from Providence to Boston, 42 miles, winning time three hours forty-two minutes, or 11⅓ miles per hour.

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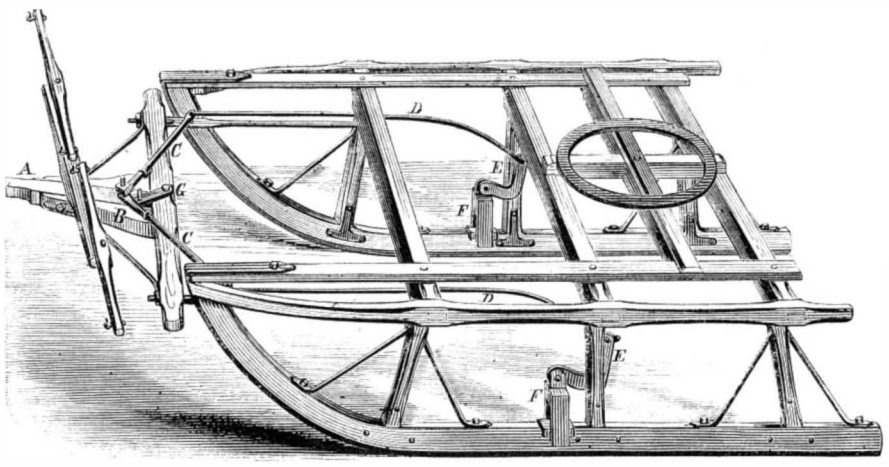
Improved Sled Brake.

Brakes for receiving the gravitation of the load on inclines are in frequent use on wheeled vehicles, and similar appendages have been applied to runners traveling on snow. None, however, seem to be more effective and simpler than that illustrated in the engraving. Its construction and operation may be easily comprehended.

The pole, A, is allowed to move backward and forward in the "hounds," B, being kept in place by a bolt passing through the "hounds," and a slot in the pole, or by any other suitable mechanical device. To the end of the pole, on the top is secured by a bolt, two levers, C, which are connected with bars, D, to a bell crank, E, on each runner. This bell crank engages with a forked slide, F, extending on each side the runner and working vertically in a simple guide.

When the horses are backed they throw the slides into the snow or ice by means of the retrogression of the pole through the medium of the levers. If while no pulling force is exerted by the draft animals the driver desires that the brakes shall not act, he has only to move with his foot a simple lever stop, G, which holds the pole extended.



NARAMORE'S SLED BRAKE.

It is evidently a simple contrivance, efficient, and not liable to become deranged in using. One advantage is, that the edges of the brake are narrow and do not cut up and ruin the road. It was patented by H. L. Naramore, of Cummington, Mass., through the Scientific American Patent Agency, Sept. 11th, 1866. For more details and for purchase of rights and territory, address Mr. Naramore as above.

RAILROAD ITEMS.

The United States have 36,896·26 miles of railroad completed and now in working order. This is an increase of road brought into use during the year of 1,535 miles, exclusive of some 200 miles of city railroads added to the length reported a year ago. The State of Pennsylvania owns 4,650 miles of track. Ohio ranks second, with 3,401 miles, followed by Illinois with 3,250 miles, and New York with 3,025 miles of road now in working order. Distributed into geographical regions, the New England and six Southern interior States own each one ninth; the five Middle Atlantic States one quarter; the twelve Northern interior States two fifths; the two Pacific States one seventh; and the five Southern Atlantic States one seventh, of the total length given above. In cost per mile the highest priced roads are the through lines of New Jersey, the Hudson River, the Baltimore and Ohio, and the Reading Railroads, in their order. The total cost of all the roads in the country amounts to $1,502,464,085, at an average cost per mile of $40,723. From a length of only three miles in 1828, the railroads of the country have steadily increased, until now the United States are traversed by a longer track than is found in all other parts of the world together, and sufficient to girdle the whole earth at the equator with a double track line.

The organization of a new Pacific Railroad Company composed of Southern capitalists and prominent men is announced. The route proposed is from some convenient point on the Gulf of Mexico, by an air-line route 1,268 miles long to the Pacific Ocean. The aid of Congress in constructing theroad is relied on, as the company claim that if the annual expenses to the government for military purposes along the line of their proposed route were to be capitalized, and the bonds thus created loaned to the company as the road progresses, the road would be completed without incurring expense to the country above what otherwise must be expendedfor years to come in furnishing military protection to the region through which the road is to pass.

A memorial has been presented to Congress praying for a charter to build a railroad from Galveston to Kansas. The project is to build a double track, to be owned either by the state or by a corporation, and has this peculiarity, that like the canals the track is to left open for free competition to all individuals and transportation companies. The rolling stock will be owned and run by these parties, they paying a certain to toll the owners of the track. By this arrangement the capacity of the road, it is claimed, may be increased tenfold and the cost of transportation reduced one half.

The estimates of the cost of the Northern Pacific Railroad prepared by Brevet Brig.-Gen. Simpson are as follows:—For construction of 204 miles of road, $150,000,000; for rolling stock and fixtures at $11,200 per mile, $23,000,000; for steamers on the Missouri and Columbia Rivers, $3,000,000; for engineering and contingencies, $10,000,000; for tunneling, beyond the estimated average per mile, $11,078,000. These and other items make a total of $206,600,340, or an average per mile of $101,040.

The Central Pacific Railroad Company have received from the United States 42,000 acres of land. Thisarea was granted by a patent prepared at the General Land Office, which is prefaced by a beautiful map of the United States, handsomely colored, exhibiting all the states and territories with great distinctness, as also the line of the Pacific Railroad from the Mississippi to the Pacific Ocean.

The rolling stock owned by the railways of Great Britain and Ireland at the close of the year 1866 comprised 7,414 locomotives, nearly 18,000 passenger carriages, nearly 7,000 other cars attached to passenger trains, more than 220,000 freight cars, making in all more than a quarter of a million carriages, locomotives and cars, the increase for the year being 15,061.

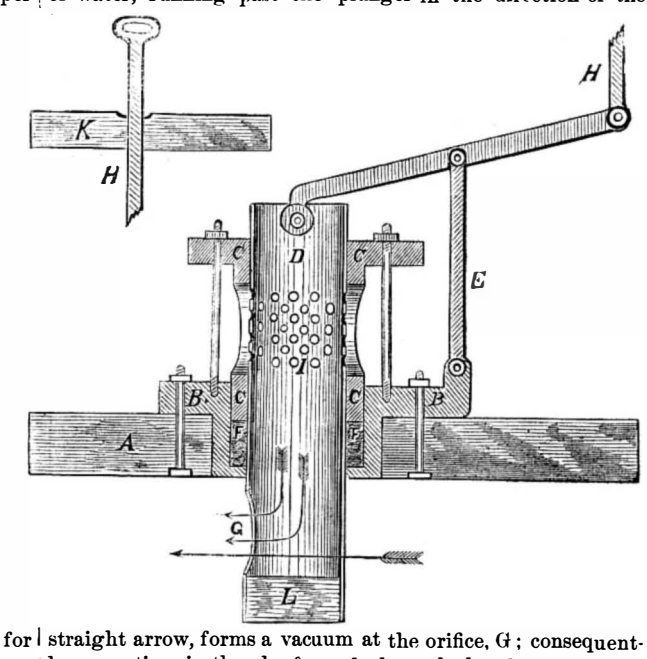
Some of the New York railroads at the last session of the State Legislature succeeded in obtaining an official condemnation of the practice of granting free passes over the roads. These roads are now as anxiously petitioning the same body to repeal the prohibitory enactment. The cause of complaint is not that the principle is not right, but that rival railroads of other states have secured a large increase of business by a liberal distribution of passes among the freight shippers and drovers of the West.

The New York Pneumatic Company, recently organized, are taking the preliminary steps toward uniting this city with Brooklyn and Jersey City. A party of engineers are now engaged in taking soundings in the East and North Rivers, with a view of locating a line for the proposed pneumatic railway. The data obtained so far are said to be highly favorable.

BAGLEY'S PATENT BILGE WATER DISCHARGE.

The annexed engraving represents a sectional view of this new device for discharging water from the holds of vessels of any kind. A represents the bottom planking of a vessel; B is a cast-iron bed plate secured firmly down with bolts; C is a cast-iron gland, with three orifices, firmly secured down on the packing, F. D is a plunger made of gas pipe; E is a fulcrum, and F the packing of rubber; G is an orifice in the lower end of the plunger; H is an iron rod that connects to the lever; I are the orifices in the upper end of the plunger; L is a wooden plug in the lower end of the plunger; K is a sectional portion of the deck.

The operation of this new machine is as follows: A current of water, running past the plunger in the direction of the straight arrow, forms a vacuum at the orifice, G; consequently a suction is thereby formed through the plunger. The bilge water in the vessel will flow through the orifices in the gland, C, thence through the orifices in the plunger, down in the direction of the bent arrows, and out at the orifice, G. By this means all the bilge water may escape from the vessel. By raising the lever the plunger is forced down; then the machine is in motion. As soon as the bilge water is all discharged, to close it uppush the lever down to the deck, K, which will bring the orifice, G, above the packing, F, making it perfectly water-tight and safe.



The working of this invention is all the same whether the vessel is moving through the water, or is stationary and the current is flowing past her.

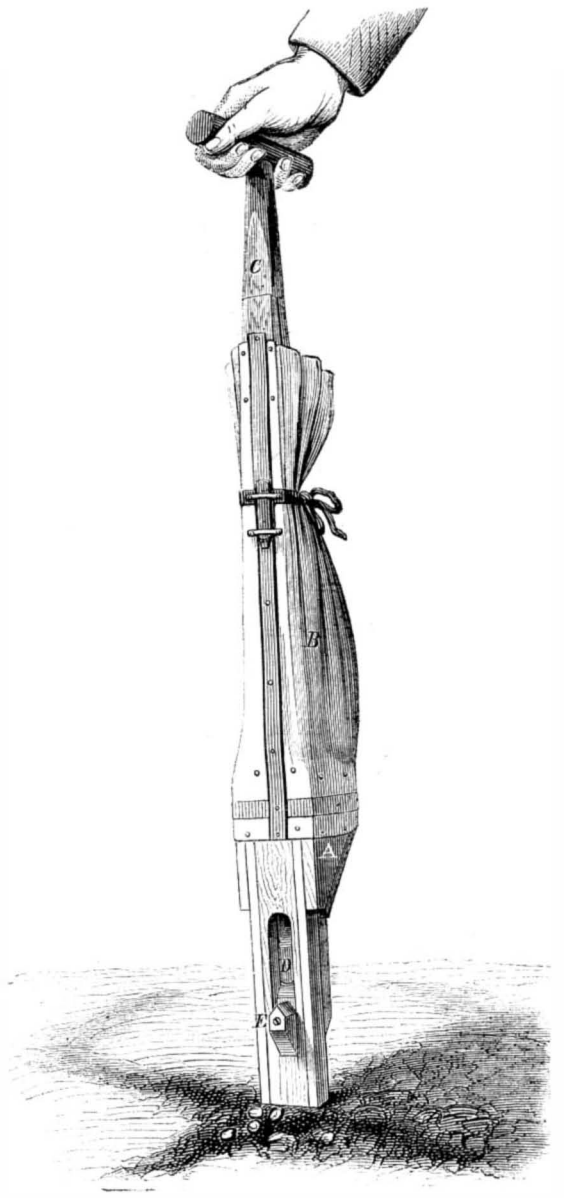
Port rights for sale on reasonable terms by applying to J. M. Bagley, 422½ North Third street, St. Louis, Mo., or M. F. Bagley, Alton, Ill.

A Deep Mine.—A coal mine at Dunkenfield, Cheshire, England, is 2060 feet deep to the bottom of the shaft, whence an inclined plane is excavated, having a dip of sixty degrees for 1000 yards, at which point the depth below the earth's surface is estimated at more than two thirds of a mile.

MC CONAUGHEY'S PATENT SEED PLANTER.

Placing corn in the hill by dropping it from the hand is a slow, laborious, and often a vexatious process, owing to high winds, which sometimes prevail at corn planting seasons. At such times the corn is blown about and the kernels lodge in improper places, as the seed of the sower in one of the parables, and possibly the mistake is not discovered until the crop appears above the soil, too late to remedy the error.

The simple device herewith illustrated prevents the seed from being dissipated by the wind, and insures its regular dropping in such qnantities as the operator may choose. It is a tube of wood made by securing sides to a center piece and having attached a seed reservoir, A, the capacity o. which is enlarged by the bag, B. The plunger, C, has recesses cut in it, which take from the reservoir, A, the proper number of kernels as the plunger is raised, and discharge them at D, where they are divided by the beveled center piece, E, and distributed. The operation is understood by the engraving. The apparatus is carried by the handle and the lower end of it placed in the hill, or at the intersection of the cross furrows. A light pull on the handle discharges the seed as shown. The number of kernels, or the amount of seed, can be regulated by a simple device (not shown), which changes the action of the plunger, so that it can be adapted to different seeds.



The device was patented through the Scientific American Patent Agency, Dec. 4th, 1866, by Thomas B. Mc Conaughey, of Newark, Del., to whom application should be made for territory in this country, excluding the States of Pennsylvania, Delaware, and Maryland.

Milk and Water.—It makes a great difference whether water is given to the cow or to the can. Dr. Dancel, in a communication to the French Academy of Sciences (quoted in the *Nation*), adduces proof that the yield of milk can be considerably increased by giving salt to incite cows to drink large quantities of water, and by moistening their food, with very little if any of the peculiar effect produced by the experiments of milkmen at a later stage of the operation. According to Dancel's observations, when a cow begins to give milk she drinks from eleven to as much as forty-five quarts of water per day, more than before. All cows that drink fifty quarts per day were found to be excellent milkers, yielding nineteen to twenty-three quarts per day. Less than twenty-seven quarts invariably marked a very poor milker. Of course the experiment of artificial stimulation by means of salt was intended only for scientific purposes. The importance of an abundant and convenient supply of pure water at all times, as much as the animal will take, is the practical deduction.

A New Delicacy.—The Paris epicures have found that snails possess a flavor superior to frogs. Consequently the trade in the latter has been for some time noticeably decreasing. The new favorites are sent in great numbers from the surrounding country to Paris, Burgundy and Champagne alone supplying 100,000 snails daily. Frenchmen eat horse meat, snails, fried Hottentot and other outlandish dishes with a relish. The French Zouave eats rats, cats and puppies. A French cook can make good soup out of dried sole leather.

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MANUFACTURING AND BUSINESS ITEMS.

METALS, ETC.—Sweet, Barnes & Co., the great steel manufacturers of Syracuse, are about commencing the manufacture of files by new machinery invented and patented by W. A. Sweet, the senior of the firm. Three hundred and fifty different kinds of files will be made, and distinguished by numbers instead of the English technical names.——A new hardware manufactory has been commenced at Greenwich, Conn., under the firm of Russell, Burdsall & Ward, with a capital of $300,000.——New rolling mills are to be started at Corry and at Hummelstown, Pa.——A cutlery concern of $100,000 capital will commence manufacturing at North Adams, Mass., next spring.——The old Wenham Iron Foundery, at North Carver, Mass., is to be rebuilt.——The New Bedford Glass Company will start in February.——The first type foundery in the Pacific states was started in San Francisco last month. Over $100,000 worth of printing types are used up in California annually.——It is stated that there are only three places in the United States where sheet and bar zinc is manfactured. These are Bethlehem, Pa., La Salle, Ill., and Mineral Point, Wis. The furnaces of Mathieson & Heghler, at Lasalle, yield 500 lbs. of this metal per day, from 12,000 lbs. of Wisconsin lead ore. Their rolling mill is capable of turning out 12,000 lbs. sheet zinc per day. The total consumption of bar zinc in this country is estimated at 10,000 tuns, most of which is imported. That of sheet zinc is much greater. American zinc manufacturers cannot compete with the foreign in price, but the purity of the article commands the preference notwithstanding, to a limited extent, for certain purposes. Most of the ore manufactured in this country is made into paint.

TEXTILES.—The Spragues of Rhode Island are reported combining with the capitalists and city authorities of Augusta, Me., to organize a vast cotton manufacture at that point on the Kennebec. It is proposed to set 500,000 spindles in operation shortly, on condition that the value added to their property shall not be taxed by the city for two years.——The Fall River Print Works are about erecting an additional mill, 408 feet long by 72 wide and five stories high. The Co-operative Mill, a very large corporation, is also going up; another is just organized, and will break ground soon; another, just erected, is awaiting its machinery from England; and efforts are making to organize still another mammoth concern, with $2,500,000 capital, for a mill with 100,000 spindles; making over twenty large cotton mills devoted mainly to the manufacture of print cloths and prints. These enterprises completed will make that city the leading manufacturing town in the United States, placing it 130,000 spindles ahead of Lowell.——A cotton mill with 2,000 spindles is going up at South Easton, Mass., at a cost of $75,000.——John Murchison of Palestine, Texas, is about to erect a cotton factory in that place, and has already imported the requisite machinery from England.——A hat manufactory is about to be started at Kennebunk, Me.——The wool of California and Oregon amounted in 1866 to 7,000,000 lbs., the major part of which was worked up in the mills of those states. The four principal woolen mills in Oregon are the Willamette, capacity 400,000 lbs. of wool and 300,000 yards of cloth annually; Oregon City, 300,000 lbs. and 300,000 yards; Eagle, of Brownsville, "3,500 yards weekly, and 1,500 lbs. of wool annually" (so the state official report is printed in an Oregon paper); and Ellendale, 75,000 lbs. wool, 90,000 yards cloth, and 30,000 lbs. yarn.——The Oregon Iron Works, at Portland, consume about six tuns raw material, and turn out work to the value of $1,000 per day. There are a number of iron works in Portland and other places nearly equal to this.——The pioneer silk manufactory at San José, Cal., is now nearly or quite ready for operation.

PAPER.—A new paper mill is to be erected at Bennistown, Pa., by a Buffalo company.——The Stewart distillery at Buffalo has been purchased for a paper mill by another Buffalo company, of which Ira Hersey is president. with a capital of $1,500,000. It is expected to turn out forty-six tuns daily, and to manufacture manilla and printing paper from grasses, by a new invention called the "Meech process."——It is estimated that there are now 1,000 paper mills in the United States, with an aggregate capital of $40,000,000, and a daily product of 1,200 tuns. Rags are consumed to the value of $60,000,000 per annum.

OILS.—Oil boring, strange to say, has been run into the ground. The quantity thrown upon the market, together with the diminished exportation, has reduced the price so low that the smaller wells will not pay for working, and are in many cases abandoned. Others are shutting off to await better times and help work up the price. Still others are storing away on the ground for an advance. An Oil Producers' Association is talked of.——The whale fisheries of 1866 have been more than ordinarily successful: 311 American vessels (against 279 in 1865) having secured 85,323 barrels of oil, an increase of nearly 24,000 barrels. Besides this, 109,000 barrels of oil were imported and but 9,370 barrels exported.

VARIOUS.—The shipbuilding of Maine has increased 25 per cent this year: estimated tunnage built, 100,000, to 80,000 in 1865.——The propagation of fish is increasing considerably in New England. Many farmers in Massachusetts make a paying business of their ponds.——Over seven million tuns and $256,000,000 worth of property passed through Buffalo in 1866.——It is remarked that the growth of the wheat product of Minnesota is unexampled. The export of the last year amounted to 9,267,153 bushels. The taxable property of the state increased $12,000,000, or 25 per cent, in the same period. The population is 340,000, of which one in every seven go to school.——The salt mines of Nevada are among the wonders of our mineral territory. A single bed covers 50,000 acres with solid rock salt, 95 per cent fine, and deeper than any shaft has yet been sunk. The accumulation continues without intermission, from the salt water which wells up, overspreads the surface and evaporates, leaving a snowy spread of fine salt, of which 2,000,000 bushels are gathered annually.——The wine product of Los Angeles alone is calculated at over 1,000,000 gallons in 1866.

EUROPEAN VS. AMERICAN COTTON AND WOOLEN MACHINERY.

A correspondent from St. Charles, N. C., sends us a letter directing our attention to an article on the above subject which, he says, is going the rounds of the Southern press. The article is a letter published in the Raleigh (N. C.) *Sentinel*, and introduced by the editor as one received by Wm. H. Willard, Esq., from "one of the most practiced and successful operators in the Southern States." We copy the letter in full:—

DEAR SIR:—I notice by the newspapers the great improvements going on in manufacturing in North Carolina.

Last fall I went to Europe to get posted with regard to machinery of all kinds for the manufacture of cotton and wool. and to purchase woolen machinery for the mill I am now in. I returned in January to prepare my buildings, water wheel and shafting for the machinery on its arrival. We have but a small mill yet—only two sets 48 inch cards, but with my European improvements we can do a great amount of work on them. Last week we carded 5,073 pounds of clean-scoured wool, enough for six thousand yards heavy, all wool, goods. If I had supplied myself in this country I could not have done more than half that amount of work. We run our carding and spinning night and day. Our goods are all sold as fast as made—our agents in Baltimore wrote last week that every yard was sold.

I found the best cotton machinery in England, and the best woolen machinery in France, Belgium, and Prussia, except spinning, which these countries now get from England. I have machinery running from four different countries. I went in company with Mr. Johnston, of New York, was with him while there and came back with him. He purchased from one company eighty-six mules running from seven hundred to eight hundred spindles each. Garnn & Co., of which Mr. Johnston is manufacturing partner, run 4,200 looms on printing cloths. Mr. Johnston goes to England every year—he is there now.

He is throwing out all his American machinery up to the spinning, and that he replaces with English as fast as it wears out. When I was last at his largest mill, he was throwing out six of Whiton's best lappers, almost new and as good as any he makes, and putting in English. I think Mr. Johnston the best cotton manufacturer in this country. Garnn & Co. were hard run, and their paper was as low as any in New York fifteen years ago, now they are rated at seventeen millions. They have been gradually changing their machinery for English since 1857. I state these facts to show you what the best cotton manufacturers are doing. It is important to the people of the South that their mills should have the best machinery and start right, instead of being behind Yankee mills. When Mr. Johnston returns I will give you a letter to him if you wish to see his machinery. The James River Manufacturing Company, of Richmond, have changed all their preparation up to the spinning. I ordered the machinery for them from some of my English friends. I have prices and specifications which I can give you if you wish to order. In England they use no top-flat cards, nothing but the style of one I inclose, one is equal to six old-fashioned top-flat cards. With the fly comb they now put on, you can run the doffer thirty in a minute, if you wish to, and the comb will clear it, to spin 36. Mr. Johnston runs 22-inch doffers thirteen to fifteen. If you should wish any cotton or woolen machinery, or know of any person South who does, you may direct to me here, and I will send you blank specifications with prices. Duty is 35.70 on machinery.

Our correspondent very naturally asks, "Can it be posssble that the English are so far ahead of our mechanics in the manufacture of machinery?" It is difficult to reply satisfactorily to this interrogatory if we allow entire credibility to the statements of the writer referred to. Certainly some of the most important improvements in cotton machinery have been made by American mechanics. We do not refer to such inventions as that of the gin by Whitney, but to such as those made by William Mason, of Taunton, Mass., the inventor of the Taunton speeder, the self-acting mule, and the ring spinning frame. His machinery is largely manufactured and used in England, and it is difficult to believe that English workmanship is so superior to American as to make all the difference stated by the writer of the letter. We venture to assert as our belief that the eighty-six mules purchased by Mr. Johnston were of Mr. Mason's plan, and that the American machinery he is throwing out and replacing with English is not of the best kind manufactured here. If our surmises are wrong it is high time that our inventors and mechanics bestir themselves and gain, at least, an equality with Europeans in the manufacture of cotton and woolen machinery. But really the letter appears to be an advertising dodge to benefit the writer as agent for some foreign manufacturers, especially as there is no such firm in New York as "Garnn & Co."

The New Word "Photogram."

"CARL BENSON" asks through the New York *Times* "What does the SCIENTIFIC AMERICAN propose to do with *autograph*, *monograph*, *paragraph* and *lithograph*, all of which represent the *thing* and not the *agent*?" We have no means of knowing whether this gentleman means to call for information or to convey a challenge. To meet each supposition in turn: First, what does Mr. Carl Benson think should be done with *epigram*, *anagram*, *telegram*, and *monogram*; all of which words are classically constructed to indicate the thing and not the agent? There is something anomalous in the past manufactures of our word-wrights, on one side or the other, and we have shown clearly where it is. If we are to be too conservative to "reform it altogether," is that an argument for going on under the wrong precedents when we have an equal number of right ones to follow? For our own part, we think enough of a correct and consistent analogy in the structure of words, to be willing to sacrifice the four wrong words to the four right words above cited. "Paragram" would have a nine-days oddity about it, we confess, but the three less popular words would give but rare offence to prejudice in the corrected form. Put them all into good *gram*mar at once.

THE GREAT PEAT DELUSION.

BY PROFESSOR CHARLES A. SEELY.

A simple inspection of the composition of peat furnishes data for a very close estimate of the quantity of heat it can produce in burning; and thus we may easily arrive at a good opinion of its money value. For the heat producing power is what we want in fuel, and other things being equal the price of fuel must be ruled by it. Prof. S. W. Johnson gives the following as the per centage composition of the best quality of compressed peat:—Carbon 47·2, hydrogen 4·9, oxygen 22·9, ash 5, water 20. Water, ash and oxygen being incombustible cannot contribute to the heat, and the kindest view of them in peat is that they are simply worthless. This worthless matter is then 47·9 per cent. The oxygen is not in a free state but is combined with and thus neutralizes its equivalent of the hydrogen and carbon. The worthless part thus increases to over 50 per cent. of the weight of the peat. And we are too generous when we consider the incombustible part only worthless, for it is positively harmful. Fifty per cent. of such matter intimately mixed with a combustible implies a reduction of the intensity of the heat to one-half, and a notable decrease in the quantity by reason of what is required to change its state. Twenty per cent. of water is to be evaporated out of our model sample, and the heat required for that slips beyond our control. Is it unfair to conclude that this peat has no more than 45 per cent of heat-producing element, and that per tun it is worth only half as much as good anthracite?

It must be noted that the above estimate is made for the best quality of peat, and that it is very far from representing the truth about peat in general. The average value of the peat proposed to be brought into market by peat companies probably does not exceed one-third that of the best anthracite.

It is claimed, however, that by the use of machines (yet untried) peat is to be so improved that it will rival anthracite. But no one has yet told us how and why manufactured peat will produce more heat. No machinery surely can increase the combustible part, or decrease the incombustible and heat consuming part. The fact is, that the effect and object of mechanism is only to improve the physical properties of peat. I suspect that mineral coal is taken as a model, and the machines are to make imitations of its admirable hardness and density. So far, no machine has been able to give peat the density of anthracite.

If any one concerned in the matter is not satisfied with conclusions reached by the above plan of reasoning, let him make the simple and practical test of evaporating water, or learn the experience of others, which may be found widely published in books and periodicals. Concerning peat, there are no questions which need receive a doubtful answer. It has been used as a fuel for centuries, and its relation to other fuel has been the constant study of ingenious men: we have the experience and the best judgment of the accurate and economy-loving German.

But all this is not to say that peat has no value in the United States. I have only labored to point out a fair criterion of its intrinsic value. Peat is simply not so good as something else. Where we cannot have the best, we very properly use and praise the poorer quality. In the desert the lukewarm dirty water is as refreshing as nectar to the gods. The pioneers of the plains use the dung of buffaloes for fuel and they seek it as if it were a treasure. Peat has been a salvation for Ireland and some parts of Germany. Our own country is very broad and we have peat everywhere. If there are localities circumstanced concerning fuel like Ireland, there peat will be a fuel. But Pennsylvania and New York city are probably a great way from such localities. What is needed now is to determine the places where peat can be used profitably. Outside of these the peat bogs should be left undisturbed till our descendants need them. Peat is only an immature coal, and we have only to let it alone, and in a few thousand years we have a coal mine. Perhaps by the time we shall have exhausted our present mines we may open new ones where now are the great Dismal Swamp of the South and the Montezuma marsh of New York.

To conclude,—peat is valuable when on account of cost of transport, coal is too dear. But the actual value has been greatly exaggerated. There is an excitement on the subject which with many has taken the character of an infatuation. Notwithstanding timely warnings of danger some of my best friends have burnt their fingers with peat. This state of things will not last long. In a few years most of the peat bogs will be left to unmolested repose, while some districts in Maine and at the West, will find their peat a bountiful gift of Providence. And history will add the story of the great peat delusion to the facts concerning Morus Multicaulis and the Hen Fever. And I trust that all the proprietors of ingenious machines may be as lucky as was Lord Dexter, who sent a cargo of warming pans to the West Indies, and realized a good profit when it was found that the warming pans could be converted into sugar scoops.

AN HONORED NAME.—The last living heir of CHRISTOPHER COLUMBUS, and Duke of Veragua, died lately in Spain.

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CONDITION OF THE PATENT OFFICE.

The calorific class, under the charge of Examiner Deane, is, we learn, close up with its work, as are some other classes.

There was a time when applications for stoves, furnaces, etc., remained unacted upon for several months, but thanks to Mr. Deane's industry the large batch of cases in his department have been worked off.

We hope soon to be able to report as satisfactory a condition of some other classes which are now sadly in arrears. If the fault rests with the Commissioner in not supplying adequate force, we hope he will see to increasing it. If it rests with Congress, in not legislating to pay ample salaries to the Examiners to stimulate them to perform their duties properly, we trust that body will authorize an increase of their pay which is unquestionably inadequate for the talent needed, and labors required. The inventors are taxed sufficiently already, but they are willing to pay more if necessary to insure the prompt action of the office upon their cases. Many applicants for patents in some Classes quietly demur at the delay in the examimation of their cases, others impatient or less amiable, are more imperative and demand a reason for the seemingly partial action of the Patent Office in examining some cases about as soon as the application is filed, while others remain unacted upon for several months.

Such disparity in the time taken for a decision under the different classes, causes much dissatisfaction which would be obviated by keeping every Class on the same level.

The examination of cases in the following Classes are those most in arrears, some of which are sadly so: Metallurgy, which includes Locks; the portion of Hydraulics which embraces Water Wheels; Farm Gates, Wearing Apparel, Fibrous and Textile fabrics, and Fine Arts, which includes games, toys, printing, copying presses, etc.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, January 10th, Prof. Tillman presiding.

VEGETABLE WAX.

Among the novelties presented, was a specimen of vegetable wax from the island of Margaret, off the Texas coast. As it is found in connection with petroleum, the possibility of its being paraffine was advanced, but the composition of this substance is different, and more nearly resembles the tallow tree of Japan.

PLASTIC ANATOMY.

Some excellent imitations of natural fruit were shown, most perfect in shape and color and made from a composition invented by M. Julian Ledion. The same gentleman also exhibited a number of pathological specimens of plastic anatomy modeled in the same substance from cases in the hospitals of France, and which in minuteness of detail and fidelity to life were pronounced perfect by the medical critics present. A great advantage of the compound wax, which is generally employed in forming these models, is its firmness in retaining its shape in any climate.

PROFESSOR GRIMES.

The greater part of the evening was occupied by this gentleman in a labored attempt to overthrow the nebular theory of Laplace and to substitute therefor an original hypothesis. Statements were brought forward which could only support his position by an utter disregard for all the established and universally received laws.

PROFESSOR TILLMAN.

In closing the meeting, the chairman, in reply to an irreverent expression which had been used during the evening, spoke of the revelations of science as confirming more strongly our belief in an all-wise and all-powerful Creator. Modern investigations prove that the myriads of stars, or suns, are but parts of one grand system guided and governed by the same will.

Research shows that the known universe is pervaded by a subtile ethereal medium, in which all celestial bodies are immersed and through which an ubiquitous power is incessantly exerted: further we have reason to believe in the existence of a still more attenuated agency reaching to the very confines of the spiritual, and through which the Creator may communicate with his rational offspring. But this is a field of mere speculation, and we are compelled to confess, "His ways are past finding out." Science can only definitely testify to the presence throughout the universe of a unity of power and of design, that power being the Divine Energy, and that design a direct emanation from the Deity.

The Diamond Drill.

The apparatus for boring rocks with diamonds was originally patented in France by Leschot, in 1864, and was rendered practical by Pihet, in 1866. It consists of an iron tube, the end armed with a series of black diamonds of Siberia, which are set in such a way that by turning the tube they excavate an annular groove in the rock, and leave in the center a solid cylinder which enters the tube, and is easily broken off and extracted when the boring is finished. Fifteen such machines have already been manufactured. The progress is about three quarters of an inch per minute. The diamonds wear very little; it is known that this also is the case with the glazier's diamonds, and that the black diamond is a variety much harder than any other. The expense of boring with a machine of this kind is not materially greater than boring in the old way, although more work is turned out; but the great advantage is, that in the same space where three borers were attached, eight of these machines may work, requiring not more power to drive them. The expense of excavating tunnels with a single machine of this kind, in hard rock, was found in France to be forty or fifty francs per cubic meter, which corresponds to $6 or $8 per cubic yard.

HINTS FOR INVENTORS ON STEAM CONDENSERS.

[For the Scientific American.]

The connection of condensers with steam engines, seeks, in general terms, to subserve one of two purposes, viz: (1) either the reduction of the vapor to fluid that it may as such be returned to the boiler, or (2) the restoration of it to the water state that it may be devoted to some other use.

The problem submitted to invention for solution under the first head, is to effect the condensation at the highest possible temperature and to return the product to the boiler as near the ebullition point as attainable. The conditions under which these two ends can be accomplished, are to be met in the apparatus, and to realize them is the task which mechanical and chemical talent has proposed to itself. He who comes nearest a full satisfaction of these *desiderata* will give the world a most valuable invention. In all attempts to reach these results, there are some well-settled facts to be borne in mind. Among them are the following:

That water contains a large quantity of air in a state of solution, and that by boiling it, this air may be liberated, so that the liquid contains less than any assignable measure: that water freed from air will not boil at all, but at 260° Fah., or thereabouts, explodes into steam with destructive energy: that water in this state and at the temperature noted, will burst into steam if so much as a drop of the fluid in its natural condition be thrown upon it.

These are facts familiar to the manipulations of the laboratory. Others belonging to the same family are as follows: that water in being crystallized is deprived of every atom of air—hence ice possesses not a particle of it: that ice, melted under oil to exclude the atmosphere, does not, upon taking the liquid form, boil at any temperature, but explodes with violence at about 260° Fah. These are facts not so familiar, but nevertheless well established and incontrovertible.

Related to the subject before us, and therefore embraced in the investigations of the inventor, are also the ensuing: that all fresh water used in boilers is impure: *i. e.*, invariably consists of something more than hydrogen and oxygen combined: that in heating it, the acid and alkaline matters existing or evolved form salts, which present themselves in solution or in incrustation: that in boiling it, the air contained is slowly set free and mingled with the gases generated in the formation or by the resolution of the salts: that upon depriving water of its air, the adhesure of its particles seems to be greatly intensified, and its elasticity destroyed, insomuch that a stream of it poured into a glass tube gives a peculiar metallic sound

In the presence of these three series of facts, it becomes us to inquire whether a steam condenser, which collects and returns to the boiler the vapor that the engine discharges into its exhaust, will not gradually separate the air incorporated with the water and thus (*a*) steadily advance the point at which steam can be raised from 212° to —° Fah: and (*b*) finally. at 260° Fah., cause an explosion of the boiler.

Another question, not yet answered by invention, though intimately blended with this, is whether by any means within practicable reach, the air set at liberty by ebullition can be re-combined with the water and thus preserve the liquid in its normal status.

In most condensers of the kind under review, provision is made for the escape of the gases generated by the impurities of the water, and with them, of the air upon which the vitality and safety of the fluid depend. Could not these gases be discharged without carrying the air with them? Or could they not be absorbed without taking up the latter also? These are practical and important inquiries to meet and satisfy.

If a steam engine could work without loss a condenser without leakage, and thus return to the boiler all the water originating from it, the probabilities are that it would prove a source of serious apprehension and not be a desirable thing under any circumstances. Hence another question arises, and that is, how much water in its natural state should be supplied to the "fountain of power" under assigned conditions, to prevent the boiling point from approaching too near 260° Fah: or rather, at what figure on the sliding scale from 212° to 260° Fah. should ebullition be secured in view of the greatest economy of fuel and of the highest safety of operation.

From these considerations it would appear that the more complete the condensation, where the water is restored to the boiler, the higher the ebullition point rises above 212° Fah: that as this point ascends the scale of 48°, the temperature at which the water can be returned to the boiler should be increased; and lastly, that the thermal line, if we may be allowed the expression, on which the steam will condense, passes upward correspondingly toward 212° Fah.

SUGGESTOR.

Goods for the Paris Exhibition.

The ship Mercury, bearing the second installment of contributions to the Paris exhibition, sailed for Havre, on Saturday, Jan. 19th, with about 1,500 packages, or nearly 1,000 tuns in measurement. A large proportion of the cargo comes from New York city and state, and comprises a large variety of the products of mechanical skill, such as machinery, agricultural implements, etc. The Western states are also well represented. California sends rich specimens of ores and various agricultural products. Illinois sends a school-house complete, the materials being sufficient in bulk to load three rail-cars. From Philadelphia there was received a huge machine weighing forty tuns, designed for working iron. Connecticut is represented by a contribution of fire-arms, and Massachusetts by fabrics from mills and workshops. A handsome street railway carriage, from the manufactory of John Stephenson, in this city, goes to the Exposition, on its way to Bombay, India.

A Clark Telescope is advertised for sale, in this number. We understand that a rare opportunity is presented of obtaining a fine instrument.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Water Spouts of Tusquitta.

Messrs. Editors:—In a recent issue of the Scientific American, "D. C." gives a very interesting account of the effects of water spouts at Tusquitta; but to an unscientific reader like myself he fails to give any easily understood theory as to how such perpendicular-sided cuttings could have been made by the mere falling of water. He says: "These canals could only have been cut by the force of a descending sheet of water." I also can easily imagine the water must have been descending; but I can hardly believe it was only in a descending state.

From his description of the awful state of the elements at that time, and of the impetuous closing together of two such vast and overcharged clouds, it is easy enough to conceive that the immense body of water which they each contained must have had its natural tendency to descend, thwarted or neutralized by a swift rotary motion of the whole mass, given to it perhaps by a still swifter motion of a vast enveloping ring of electricity, flying round and round it vertically—that is, over and under it—and thus confining the water within its folds, and imparting somewhat of its own velocity to it. The result of two clouds under such circumstances coming together and both rotating in the same manner and in the same direction, would be a sudden flattening and spreading out of the parts in contact, giving, probably, a still more increased swiftness of motion to that part of the clouds thus flattened and extended.

D. C. says that when they met they shot instantly upward. Yes, and no doubt they shot as instantly downward, and not only so, but circularly too, though such fact might not and would not be perceived.

At this stage of the imbral combat, the under part of the periphery of this gyrating cloud wheel coming in contact with the earth, acted on it like the edge of a swiftly revolving circular saw, cutting for itself a clean sided channel, where it first struck, and widening the cutting, and leaving it less clearly marked as it continued its descent and lost its electrical power; until, by degrees, the volume of water thus discharged on the sides of the mountain would follow its natural laws, and the electric phenomena obeying also the great fiat of nature's God, would quietly subside.

This view of the matter would easily account for the peculiar appearance of the chasm at the spot so evidently first struck. One can scarcely conceive that water alone could be capable of cutting the roots of trees as clean off as though done with a knife, while it is easy to imagine the electric fluid to have been the author of it in some way or other, if not exactly in the way I have ventured to surmise.

J. H. Hodson.

Perspective Drawings.

Messrs. Editors: A sentence in the article on Perspective Drawings, in the Scientific American (No. 2, this volume) is likely to give trouble to some artists, judging from what I had myself, and for the same reason: that of supposing that, because a photogram of a street scene exhibits a convergence of vertical lines, therefore a *true* perspective drawing should have the same convergence. I therefore proceeded to various nice experiments, even to place myself in the same position whence the photogram was taken; but it was of no avail: the vertical lines would persist in remaining parallel and perpendicular to the horizon. But as something must be wrong, whenever two operations conducted on the same principle do not agree, I determined to find where the error was, and therefore proceeded to examine more closely the photogram, notwithstanding its reputed infallibility. The cause soon became plain: When a photographer takes a street scene from a certain altitude, he has to incline his instrument a few degrees, thus giving the sensitive plate a slight inclination forward. The plan is no longer a vertical one, and hence the *necessary* convergence of vertical lines. If the plan had an inclination of 45°, both vertical and longitudinal lines would converge alike. Continuing the inclination downward, the longitudinal lines will converge less, and the vertical ones more, until we reach the horizontal position, in which the plan exhibits no convergence either in longitudinal or transverse lines, but all vertical lines converge more or less according to distance. Yours, respectfully, E. Rose.

Ottawa, Ill., Jan. 14, 1867.

The Amazon.

The Emperor of Brazil has decreed that the vast inland system of the Amazon and its great tributaries, the Tocantins and San Francisco rivers, shall be freely opened to the commerce of all nations. Prof. Agassiz tells us that the climate of the immense valley of the Amazon is delightful. A cool breeze goes up the river at all times, the thermometer varying between the extremes of 72 and 92 degrees, and averaging 84. He says that although warned beforehand that he was going into a region of death, he found that there were no dangers and hardly any discomforts to be met with. Perhaps the Professor was unduly propitiated by his unprecedented haul of fish. The whole region is a vast plain—an unbroken expanse of wood and water—having a descent of only 210 feet in 3,000 miles. The annual swellings of the river rise from 30 to 50 feet, and convert the whole into an ocean for some months of the year, centering in June, and communication is then carried on by boat paths among the tree tops. The primitive and universal forest is almost impenetrable, and filled with the choicest timber, of which 117 costly varieties cut from a tract half a mile square, were lately displayed at a provincial exhibition in Para. The length of the valley

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is 2,000 miles, and the width 1,000. The waters are coffee colored, except those of the rivers that rise in the woody plain, which are more like molasses. In some places it is equally impossible to see across them or to see through them. We should think the country must be delightful and healthy —for alligators—and possibly for naturalists.

LADIES habitually carry pins in their mouths—we mean in the dressing-room—and always insist that no harm ever came of it. On the contrary, there are frequent warnings in the shape of fatal accidents resulting from this practice. A tailor at Croydon, England, met his death the other day, in consequence of bending a needle between his teeth and accidentally projecting a part of it into his throat.

THE wheat exports from Minnesota last year amounted to 9,267,153 bushels. The wheat crop of the United States (exclusive of the Pacific States) for this period is given as 153,045,857 bushels, an increase of 5,000,000 bushels over the crop of last year. The exportation of grain from California during the year will exceed $6,500,000 in gold.

CRACKED BELLS.—A cracked bell, producing a disagreeable, jarring sound, is repaired by sawing or filing the walls of the rent so that the slightly-disparted edges may not be brought together by the vibration of the blow.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

GATE.—S. A. Kroner, Doylestown, Pennsylvania.—This invention has for its object to furnish an improvement for gate so constructed and arranged that the gate can be easily opened and closed; that it can be opened in any depth of snow; that it will not blow open or shut; that it will exert no side pressure upon the posts; and that is applicable to gates of any form or size.

WINDLASS ELEVATOR FOR RAISING WATER AND OTHER PURPOSES.—W. E. Babcock, East Pembroke, N. Y.—This invention consists in arranging a drum upon a shaft in such a manner that, while it is entirely secure from accident while the weight is suspended from it, a slight reverse movement of the crank sets it free, and allows the bucket or weight to descend without turning the crank.

PETROLEUM STILL.—William C. Welles, Parkersburg, W. Virginia.—This invention consists principally in securing the fire sheets, or plates, to the bottom of the still, through the medium of a frame, whereby many important advantages are secured.

TIE CHAIN FOR CATTLE AND OTHER ANIMALS.—Cyrus M. Baker, Bingham, Maine.—This invention relates to a new and improved tie chain for hitching cattle in their stalls, the object being to produce a tie chain of such a nature that the cattle, when hitched by it to their stalls, can not shift or move their heads to the other side of the posts or stanchions to which they are hitched, thus obviating all danger of the chain becoming twisted, which oftentimes causes the choking of the cattle.

STEAM PUMP.—George Doyle, Worcester, Mass.—The object of this invention is to improve and simplify the means of operating the steam valve in pumps of this description.

SUBSTITUTE FOR CURLED HAIR.—H. R. Hildreth, and W. H. Smith, Dutch Flat, Cal.—This invention relates to a new and improved substitute for the ordinary and common curled hair, so-called, used for the stuffing of the backs and seats of chairs, sofas, lounges, mattresses, etc., and it consists in so treating the fiber of the soap plant so known, as to convert or manufacture it into the proper form for being used as a substitute for the common curled hair, or as a stuffing for mattresses, the seats and backs of lounges sofas, chairs, etc.

MARINE MOTORS.—W. P. Kirkland, San Francisco, Cal.—The nature of this invention consists in applying as a motive or driving power, the speed or force generated by the propulsion of a vessel through the water, which result is obtained by so arranging a suitably shaped water wheel within the keel or bottom portion of the vessel, immersed in the water, that as the vessel moves through the water, it will be acted upon thereby, and thus made, through any suitable arrangement of connecting parts, to operate the ship's pump, or pumps, or any other desired mechanism of the vessel.

CLEANING KNIVES, ETC.—R. R. Pattison, Chicago, Ill.—This invention relates to a machine intended more particularly for the cleaning or scouring of table knives and forks, although it can be used for other knives, etc.

AMALGAMATOR.—Syranus Standish, Pachea, Cal.—This invention consists principally in providing the rotating muller shaft with a series of spiral flanges or wings, which, as the muller revolves, cause the pulp to be forced under the shoes, and thus brought into contact with the quicksilver or mercury used.

COAL HOD OR SCUTTLE.—David Wright, New London, Conn.—This invention consists in providing a coal hod or scuttle, with a mouth or spout at or near its lower end, for the purpose of removing the coal therefrom without necessitating the lifting of the scuttle.

AUGER.—A. C. Kasson, Milwaukee, Wis.—This invention consists in forming the twist of an auger or auger bit, so that while half circles shall be formed by the twist for the discharge of the shavings by turning the edge of the twist inward, the cutting lip of the auger shall receive its shape from the form of the twist, and the outer edge of the twist shall be a cutting edge the whole length.

PUMP VALVE.—A. S. Cameron, New York City.—This invention relates to a pump valve, which is made of india-rubber or other soft and elastic material, confined in a metallic case, in such a manner that when the valve comes down on its seat, its elastic face will freely accommodate itself to she same, and close tight, and at the same time the india-rubber or other soft and elastic material is confined in the metallic case, so that it cannot be compressed sufficiently to allow metallic contact between the valve and its seat, and, furthermore, by the metallic case the india-rubber or other material is protected, and a valve is obtained which is not liable to leak, and which will not wear out or require refitting for a long time.

SAD IRON.—B. B. Hood, Milford, N. H.—This invention consists in constructing a sad iron with a metallic face and handle, and with the body of the article composed of soapstone or other mineral substance.

PLOW.—William S. Huntington, Byron County, Mich.—This invention relates to a device to be attached to a plow for the purpose of preventing it rom choking by the accumulation of weeds, grass, stubble, etc., in front of the mold board.

SMOKING PIPE.—James W. Truman, Macon, Ga.—This invention relates to an improvement in the packing of a pipe stem tip, which is so constructed that it will be durable, easily applied, and not liable to drop off.

SEEEP PEN.—Burton Gifford, Pedee, Iowa.—This invention has for its object to economize feed and time in feeding sheep, and to promote their healthy condition.

HOG PEN.—Burton Gifford, Pedee, Iowa.—This invention has for its object to furnish an improved hog pen, so constructed as to prevent the animals from wasting their food, and so as to promote their healthiness and cleanliness.

DISH WASHING MACHINE.—Gilbert Richards, Cummington, Mass.—This invention has for its object to furnish an improved machine, by means of which dishes may be washed quickly and thoroughly.

SMOKING STAND.—John Holmes, New York City.—This invention consists in a smoking stand, which is provided with a reservoir for smoking tobacco, for cigars, for snuff, for chewing tobacco, for matches, and for pipe lighters, and also with a suitable bracket to support a pipe, in such a manner that all the utensils required by smokers or by persons using tobacco are contained in a narrow space, and persons in quest of one of the above-named articles can easily find them, and, furthermore, a stand is obtained which can be manufactured at a reasonable cost, and which forms an ornament for a counter in a public house or for the mantelpiece in private or dwelling houses.

TURNING MACHINE.—Franz Anton Armbruster, New York City.—This invention relates to a turning lathe, which is intended particularly for the manufacture of pipes, but which may also be used for articles of any other description. The tool or tools used in turning are secured to a chuck, which is fastened on the spindle of the lathe, and said spindle is so arranged that an oscillating motion can be imparted to it for the purpose of turning such parts as, for instance, that portion of the bowl of a smoking pipe where the same joins the stem, and where the tool cannot pass clear round. The oscillations of the tool holder can be increased or decreased according to the article to be turned.

STOVE.—Samuel S. Utter, New York City.—This invention consists in the arrangement of a secondary air chamber, and a separate plate over the bottom part of the back plate of the fire place of a stove, in such a manner that an additional space is obtained for heating the air before the same is allowed to pass to the main air chamber, and through it to the fire, and, furthermore, by said secondary air chamber, the lower part of the back plate is prevented from burning. It consists further in the arrangement of air channels leading from the back plate of the stove down to the lower part of the back oven plate, in combination with the air chamber in the back plate of the fire place, in such a manner that the vapors rising from the articles to be baked are free to escape, and a supply of hot air is carried to the oven and to the fire, and thereby the process of baking is facilitated, and the gases emanating from the fire are consumed more perfectly than in ordinary gas-consuming stoves.

MACHINERY FOR DRESSING AND SEPARATING FIBER OF PLANTS.—Edwardo Juanes y Patrullo, Merida, Mexico.—This invention relates to an improvement in machinery for dressing and separating the fiber of the leaves and stalks of tropical and other plants, such as the banana, cocoa, and the agave Americana.

CONVERTING MOTION.—Augustus Eckert, Trenton, Ohio.—This invention relates to a novel kind of an escapement, which is so constructed that by the action of a weight or spring on suitable gear wheels an oscillating motion can be imparted to a pendulum, and a device is obtained which can be used to advantage for operating a fan, or for imparting motion to a device of a similar nature.

CONDENSER.—J. P. F. Datichy, West Hoboken, N. J.—This invention relates to an improvement in that class of condensers which are based on the application of water or air, separate or together, so as to condense the exhaust steam of an engine, and return the same to the boiler.

PILE FOR MAKING STEEL-HEADED RAILS FOR RAILROADS.—Herbert Davis, Troy, N. Y.—This invention relates to a new and useful improvement in the manufacture of steel-headed rails, or those which are composed of an iron neck or base and a steel head or upper surface. The invention consists in a novel manner of forming the pile from which the rail is rolled, whereby the steel head or upper surface is firmly connected to the lower iron portion, and effectually prevented from separating under the wear and tear to which the rail is subjected by the action of the car wheels upon it.

BEEHIVE.—Orson Colvin, Belvidere, Ill.—This invention relates to a new and improved beehive, and it consists in a peculiar construction of the same, whereby the bees will be protected from dampness and from severe cold in winter, and better provision made than usual for the removal of surplus honey from the hive.

NECK YOKE.—Alonzo Benedict, Janesville, N. Y.—This invention relates to a new and useful improvement in the connection employed between the neck yoke and draft pole. Hitherto leather alone has been employed, and this soon becomes worn and cracked, and is very liable to break or give way. The object of this invention is to obtain, at a small expense, a durable connection and one which may always be kept in proper order without the aid of a mechanic.

APPLYING OR LAYING PLASTIC ROOFING.—Lorenzo D. Ford, Canaan, N. Y.—This invention relates to a new and improved mode of laying that kind of roofing which is composed of a plastic material spread upon a foundation of paper, cloth, or other flexible material. The invention is more especially designed for the laying of what is termed the plastic slate roofing, and it consists in bending the edges or selvedges of the prepared paper or cloth in such a manner that the edges of the same, when applied to the roof, may be connected together by a lock joint, which will effectually prevent leakage.

THILL COUPLING.—John F. Bridgett, Washington, D. C.—The thill at the point of its articulation with the clip iron is supported by a set plate whose screw is threaded into the forward extended end of the plate under the axle through which the bolts of the axle clip pass. A packing intervenes between the set plate and the thill, which latter is prevented from jarring by being passed upward against the bearings.

WINDOW BLIND.—Robert Hutton, Williamsburgh, N. Y.—Patented January 1st, 1866.—This invention relates to window blinds having tenon slats, and it consists principally in a novel manner of connecting the several slats to the operating rod employed for moving the slats.

SPRING BED BOTTOM.—H. H. Palmer, Rockford, Ill.—This invention relates to a new and improved spring bed bottom of that class in which wooden slats are used in connection with wire springs. The object of the invention is to obtain a bed bottom of the classspecified which will possess a requisite degree of elasticity and still not be liable to sink or become depressed or lose its elasticity and which will be stronger and more durable than those hitherto constructed on the same plan.

SULKY PLOW.—George Basket and Samuel M. Gaskill, Bluffton, Ohio.—This invention relates to a new and improved plow of that class which are connected to a frame mounted on wheels, so that the plowman may ride and drive while manipulating the plow, and which are commonly termed sulky plows. The invention consists in a peculiar construction and arrangement of the parts, whereby the plow may be manipulated with the greatest facility, and a very simple and efficient improvement or device of the class specified obtained.

CORN PLOW.—John Hindmarsh, Ill.—This invention relates to a new and improved plow for cultivating corn and other crops grown in hills or drills, and it consists in a novel manner of applying the plows to the machine whereby the former may be raised and lowered and also moved laterally by the manipulation of a single lever, and the plows thereby placed under the complete control of the driver and made to conform to the sinuosities of the rows of plants. The invention also admitting of the plows being set or adjusted to plow at a greater or less depth as may be desired.

DOUBLE-SHOVEL CULTIVATOR.—Silas M. Whitney, Galesburg, Ill.—This invention relates to a new and improved manner of attaching the shovel standards to the team whereby the standards, and consequently the shovels, may be adjusted higher or lower, or set to work at any required depth and also adjusted in a more or less oblique position as occasion may require. The invention also relates to a gage wheel applied to the rear part of the beam for governing the depth of the penetration af the shovels and admitting of the same being readily guided to the right or left to conform to the sinuosities of the rows of plants.

NEW PUBLICATIONS.

THE SLIDE VALVE PRACTICALLY CONSIDERED. By N. P. Burgh, Engineer. Henry Carey Baird, 406 Walnut street, Philadelphia, Pa.

Mr. Burgh is well known by former volumes on steam and other machinery. He is an English Engineer of note, and although sometimes holding opinions at variance with commonly accepted theories, he generally fortifies his position with the demonstrations of experiments. In this volume all his conclusions are drawn from actual trials, no assumptions, as such, having been admitted. The treatment of the common, exhaust, relief and equilibrium valves is lucid and plain, easily understood, and illustrated by a number of engravings, sectional and plain. It will be found a useful guide to the engineer and the mechanic.

A NEW GUIDE FOR THE SHEET IRON AND BOILER PLATE ROLLER, containing Tables estimated and collected by C. K Perkins and J. G. Stowe. Baird, Publisher, 406 Walnut street, Philadelphia, Pa.

This volume is a collection of twenty-five tables, giving the weight and proportions of slabs and piles for producing plates, with the thickness by wire gage of the product required, in feet, inches and fractions. The tables are printed on only one side of a sheet, and are well arranged for reference.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

N. M., of N. J.—"Cold short" iron is that sort of wrought iron which although tough when heated, is very brittle when cold. It will resist oxidation better than other kinds of forged iron and is distinguished by a texture consisting of shiny plates when fractured without signs of fibers. "Red short" iron is brittle when cold. It may be distinguished by the cracks and fissures on the outside of the bars. The brittleness in both these kinds of iron is supplied to be caused by the presence of sulphur and phosphorus.

L. P. S., of Pa.—We believe the first paper mill in this country was established at Roxborough near Germantown, Pa., on Paper-mill Run by William Rittenhousen, an ancester of David Rittenhouse, the eminent American Philosopher. Paper was made here in 1693.

D. A. R, of N. Y.—Sponge may be bleached almost snow white by repetitions of the following process: Soak it in diluted muriatic acid ten or twelve hours, then wash it with water and immerse in a solution of hypo-sulphite of soda to which a small quantity of diluted muriatic acid has been added. Wash and dry it.

E. W. P. of Ind.—13° Cartier are equivalent to 13° Baume. Cartier's hydrometer is used to some extent in France. The formula for converting one scale to the other is: 16C=15 BH 22.

R. L. S., of Pa.—There are inexhaustible sources of salt in the United States; there is no other country so favored in the quantity. Unfortunately, however, for the present, our best salt mines on account of the expense of transportation, are unavoidable. When Texas and the States on the Pacific coast are netted over with railroads and canals we will carry to market more salt and the substances which depend upon it, than all the rest of the world.

V. R., of O.—Your speculations on a tough and elastic glass we fear are only a dream. Mica and gelatine are fair substitutes for what you are striving for, and there is still a good opportunity for ingenuity in divising new applications of their combined elasticity and transparency.

S. C. B., of Conn.—The combustion of gas in a gas stove is seldom as perfect as from the ordinary gas light burner. As to the amount of heat, therefore, the latter has a slight advantage. The same remark is also applicable to the combustion of petroleum oil.

W. R. S., of Pa.—Carbolic acid is a substance quite like creosote in odor and disinfectant properties, and they have a similar origin. Creosote is obtained from wood tar, and carbolic acid from coal tar. Carbolate of lime is a mixture of carbolic acid and lime.

A. and M., of N. Y.—You will probably find that you can make a suitable covering for your large wooden roller out of the rubber cloth which contains no fiber: the cloth is commonly called hospital sheeting. You would find it a very troublesome business if you attempt to dissolve rubber and spread it on a large surface of wood.

C. H. I., of Pa., enquires how to tan or otherwise prepare bladder so that it will not taint the water of an aquarium if used as a reservoir.

S. P., of Ill.—You will probably succeed in bleaching your ancient engravings by exposing them to air slightly charged with chlorin, or immersing them in chlorine water, or a solution of chloride of soda, Ozone is said to be an admirable bleaching agent, and without doubt may be used successfully for bleaching ancient specimens of printing.

R. B., of N. Y.—Crude or unvulcanized rubber becomes hard and brittle at very low temperatures. Vulcanized rubber is comparatively little affected by changes of temperature, and it preserves its elasticity sufficiently for all ordinary uses. Whether the latter will answer your purpose we can give no opinion until we have more information about the use to which you propose to put it. . . . Goodyear's patents for soft rubber have expired. The patents, for hard rubber are still in force and if you use it, you must have the permission of the proprietors of the patents.

R. H. J., of Del.—The best way to preserve green corn is to dry it thoroughly. When kept moist its substance is in a more fermentable condition than that of most other vegetables, and the use of an antiferment is impracticable for the reason that it would injure the taste. The acid of fruits and tomatoes is a natural anti-ferment, and consequently they are very easily preserved.

J. A. G., of ——.—A very good way for removing the flesh from the skeletons of small animals is to place them near ant hills. The ants very soon eat up the flesh and leave the bones clean. The flesh is also sometimes removed by boiling or by placing the bodies in a stream of running water.

W. F. C., of Ill.—The pressure of water is always proportioned to its depth, and is a trifle less than half a pound for each foot. The form of the containing vessel has no effect whatever on the pressure. In the case you suppose of two vertical pipes of an inch in area of section united at the bottom by a horizontal pipe and each of the vertical pipes containing 50 lbs. of water, the pressure on each square inch of the horizontal pipe would be fifty pounds. Did you imagine it would be one hundred pounds?

Business and Personal.

The charge for insertion under this head is 50 cents a line.

A 90 horse-power Turbine wheel wanted; best construction. Address J. H. Watson, Esq., 227 Palace street, Toronto, C. W.

A dynamometer is wanted by Ford & Kimball, Concord, N. H., for measuring the power of shafting.

John S. Tucker, Omaha, Nebraska, Box 854, calls for the best laundry machinery.

B. and C., of Canada, can learn something in regard to pin machines by addressing Hoxie, Bowdoin & Co., Hartford, Conn.

Albert D. Rust, of St. Louis, Mich., wishes to engage parties to make his patent wire clothes line and fastening, patented January 4, 1867. Rights for sale. See advertisement.

O. M. Fletcher, Elmira, N. Y., wishes to communicate with manufacturers or dealers of small wood planers and dovetailing machines.

Dr. Landis, 13th street and Girard avenue, Philadelphia, Pa., wishes the address of parties who will manufacture his Patent "Magnitude Syringe and Organic Bath," on royalty, or become partners. A fortune is certain. Send for "Medical Guide" for its explanation and uses.

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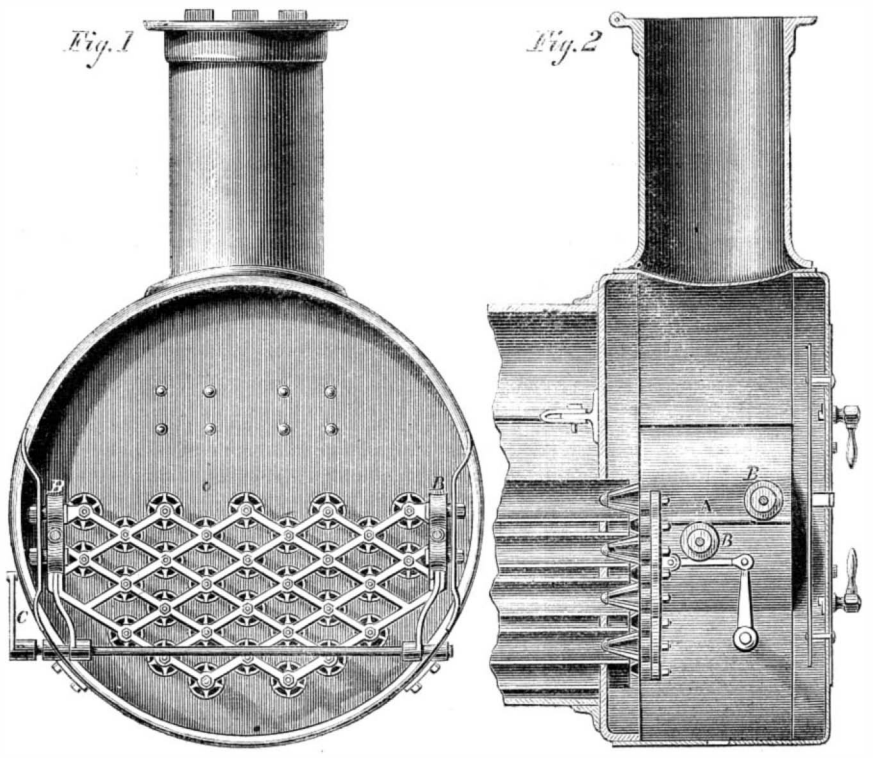
A New Device for Cleaning Boiler Tubes.

The apparatus which we represent in the accompanying engravings seems to contradict some of the accepted theories of the physicist and the experiments of the mechanic; yet, if *The Engineer*, London, is correct, its use has been attended with remarkable results. It was exhibited at the Smithfield Club Fair, a few weeks ago, by the Messrs. Robey, engineers at Lincoln, England. It is called "Lake's Smoke Consumer," and at first sight seems to produce its results on the principle of *lucus a non lucendo.*

The apparatus may be easily explained by the aid of the engravings. It consists of a series of conical fluted plugs, one for each tube of a multi-tubular or locomotive boiler, secured to a lattice frame at the intersection of the bars by bolts and nuts. The frame is suspended on two guide rods, A, which run between friction rolls, B, with concave peripheries, and is worked by the lever, C, at the side of the smoke box. *The Engineer* says: "At first sight it would appear that the only effect which such an apparatus could produce would be to reduce the calorimeter of the boiler, and with it the draft. It would be too much to assume, *a priori*, that the results would follow which we are informed on indisputable authority do really follow, and therefore we are disposed to regard the scheme more in the light of a discovery than an invention, as we cannot think that any man, resting his experience on generally known facts, only, could conclude that these results would ensue; although an acquaintance with certain experiments, the details of which are little known in this country, might possibly lead him indirectly in this direction. The first result of the application of Lake's apparatus is, that the accumulation of soot in flues is entirely prevented; they are found to be as clean at the end of a month as at the beginning. The second result is of much greater value. Messrs. Robey informs us that they have carried out a series of elaborate experiments with an engine to which this apparatus was applied. The power expended was measured by a friction brake, and the coal consumed was carefully weighed. A direct saving of 23 per cent in the fuel consumed was obtained." *The Engineer* does not attempt to account for the results it has recorded, but hints at a hypothesis which will receive early attention.

Undoubtedly this device—assuming the statements in regard to its practical results to be reliable—will arrest the attention of mechanics. We desire, however, to point to one or two facts which may have a bearing upon the problem presented by this apparatus. It will be seen that the cones are attached to the smoke end of the tubes, and it is well known that the passage of smoke and the gases of combustion through tubes is delayed or retarded by the friction on the interior surface. The gases therefore take the readiest way for an exit. In this case the action of the cone plugs is similar to that of a damper, except that they cannot entirely prevent the escape of the gases, as their surfaces are fluted instead of plain. The result would be: 1st, To compel the gaseous products of combustion to impinge upon the inner surfaces of the tube, thereby removing the soot or other depositions as fast as generated. 2d, By partially closing the tubes and delaying the escape of the gases they would become heated and thus be rendered combustible. There may be other conclusions to be drawn from this experiment, as the contracting of the chimney throat or its equivalent to insure the compression of the gases, etc.; but our object is mainly to draw attention to this remarkable device, which is more suggestive than demonstrative in its operation.



DEVICE FOR CLEANING BOILER TUBES.

Surplus Patent Fund.

If Congress will confer upon the Commissioner of Patents the necessary power, we are assured that the examining force of the Patent Office will be permanently increased without delay, so that all applications will be examined within twenty days after they are filed. This is a very important matter, and ought to receive legislative action at once. The surplus fund ought to be used, so far as necessary, to duplicate by the photographic process copies of all the drawings, and each Examiner should have a set of such of these copies as relate to his class, and for the exclusive use of his bureau. This would greatly facilitate examinations by saving the Examiner much time now taken up in hunting for drawings in the draftsman's room. The fear expressed by a cotemporary whose chief editor seems to be a pair of shears and wastes some of its time in snapping at the Scientific American, that the surplus fund is liable to be taken to apply toward the extinguishment of the national debt, is too absurd to merit notice.

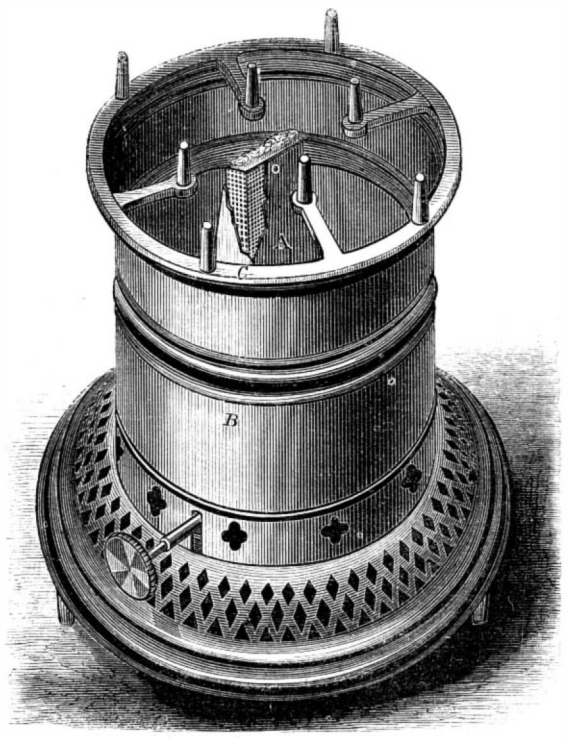
American Emery.

About a year ago we noticed the important discovery of an apparently inexhaustible mine of emery, of a superior quality, in the town of Chester, Massachusetts. It may not be generally known that previous to this time the entire amount made use of in the arts and manufactures was obtained from a few localities in Asia Minor and the Grecian Archipelago, and that two firms, one in Smyrna, the other in London, enjoyed the entire monopoly of supplying the world. That the trade was of no insignificant proportions is shown. The annual consumption in the United States by machinists and glass cutters it is estimated amounts to over 1,500 tuns. The Chester mine has been developed with such success, that it has averaged for the year a monthly supply of from twenty to thirty tuns, and the total supply up to Oct. 1st was 223 tuns, brought to market in both the massive and crystallized form. In chemical composition the mineral from this mine is pronounced nearly identical with the Naxos or Turkish emery. No less than thirteen distinct minerals have been found associated with the emery, but none in proportions or value enough to pay for mining.

The American supply has lately been further augmented by the discovery of the precious mineral on Arrowsic Island in the Kennebec river opposite the city of Bath, Maine. The value of the emery has been fully tested by numerous machinists, who have declared it equal if not superior to the best imported. The hardness of this substance is shown by the difficulties experienced in working it; fifty drills on one occasion being required to drill a hole eight inches deep, and the jaw plates of the crusher, though made of the hardest Franklinite iron, must be renewed every alternate day.

Patent Petroleum Stove.

The burning of petroleum oil and its constituents is a subject that has occupied the attention of experimentalists for several years, and inventors have largely directed their efforts to the construction of proper furnaces for its combustion, so that it could be used economically, both in the family and in



generating steam for driving engines. Several differing devices have been brought to our notice for using petroleum for cooking purposes, but none we have examined appear to combine safety, simplicity, and really scientific principles in so great a degree as the one which is the subject of this engraving.

The base of the stove is an open work, cast iron pediment, standing on three feet and holding a tin can, from the center of which rises a wide wick passing through a drum, which serves as a base for a funnel-like chimney, A. The case of this chimney is of tin lined throughout with fine brass gauze. At the bottom the chimney case has openings on the sides for the admission of atmospheric air. The cylinder, B, is of Russia sheet-iron and is surmounted by a cast-iron ring, C, having upward projecting points to sustain the cooking utensil. These points elevate the vessel sufficiently to allow the heat from the flame to circulate above the top of the stove around the sides of the kettle. There is an oven adapted to this stove which is said to bake admirably.

The can is filled with naphtha, benzine, kerosene, or petroleum, the chimney removed, and the wick lighted. The chimney is then replaced and the stove is ready for operation. If the wick is kept down below the point where the flame would produce illumination, there will be no deposite of carbon on the vessel used for cooking, and the gauze, with the plentiful supply of oxygen through the chimney apertures will yield an intense heat.

This stove is the subject of three patents issued Oct. 4th, 1864; May 22d, and June 5th, 1866. It is manufactured by the Morrill Petroleum Stove Co., No. 46 Congress street, Boston, Mass., to whom all orders should be addressed.

Poison for Whales.

The Indians of Guiana prepare a poison from certain plants, which they call woorali. Owing to its peculiar effects in causing a relaxation of the muscular system medical experimentors have often attempted to make use of this decoction as a specific remedy for tetanus or lock-jaw. A poison having just the opposite effect, that is, producing excessive muscular contraction, is strychnine. These two contrary poisons have been combined by M. Thierselm, and the result is a preparation which, if administered even in minute doses, causes instant death.

In whale fishing the compound, mixed in the proportion of twenty parts of strychnine to one of woorali, is made up into cartridges of one ounce in weight, containing enough of the poisonous compound to kill the largest whale. Each cartridge is embedded in gunpowder contained in an explosive shell, and is fired at the animal in the usual manner. If it touch the vital part the whale is gone, otherwise we doubt its efficacy.

The Nuisance of Noise.

There is one kind of noise which must be endured, sometimes even by old bachelors, because it can't be cured. We refer to the squalling of babies. All mankind in turn are offenders and sufferers in this way, and no remedy but the questionable one of paregoric, has ever been devised. But generally all other intolerable noises are susceptible of remedy. Responsible beings can be quieted if necessary by the strong arm of the law, and brutes, failing all other persuasives, can be knocked on the head, or removed to a respectful distance from the bedchamber, sick room or study—if the law so pleases. Even the terrific din of pavements can be abolished by the Nicholson plan, and the organ grinder insensible to old boots and dirty water, may be made to move on by the aid of a policeman, if one can be found. Locomotive whistles can also be made amenable to law, if the suffering people will unitedly bestir themselves. The impunity of railroad corporations in every conceivable invasion of private rights, can be abolished either by prosecution or by additional police laws. A number of manufacturing towns in England, impelled by the depreciation of city property near the railways, have united to carry through Parliament a measure conferring police authority to summarily stop all unnecessary screeching and ringing of locomotives within city limits. We commend the suggestion to the legislators of American cities and states, with the addition of obstreporous dogs, roosters and hucksters to the objects of their attention. A society for the prevention of cruelty to human beings ought to be formed, as soon as Mr. Bergh gets the brute creation in a comfortable way.

Mechanics in New York.

Wages of some kinds of skilled labor in this city are among the exceptions allowed by Mr. Wells, (page 34, last number) to his general statement that wages have not advanced in proportion to the price of other commodities. All classes of masons, such as plasterers, brick-layers, and stone-masons, are in so urgent demand as to receive as a minimum four dollars a day, and for good hands $4 50, $5 00 and even $6 on choice work. The crudest of labor, that of hodmen, commands $2 50 per day. Carpenters, coopers, plumbers, painters and horse-shoers are not quite so well off as masons: earning $3 50 to $4 00 per day. Ship carpenters do a little better, when they get work, averaging about $4 00. Printers, iron-moulders and custom tailors average about $3 00. Shoe-makers are depressed: they are represented as generally making but $2 00 a day, which if true of good and industrious mechanics is a shame to civilization. They attribute it to the amount of work thrown into the market from the state prisons: but more probably it is the result of aggregating the boot and shoe manufacture mainly in great establishments of cheap work at Lynn and elsewhere. No branch of business has been more affected by the introduction of machinery of late years, than this. Almost every process pertaining to the manufacture of boots and shoes is now performed by steam. Bakers, who have nothing to contend with nearer to state prison fare than their own bosses turn out, get but the miserable pittance of $10 a week. No wonder the bread is poor. we hope they get enough of it free, such as it is.

Another Solvent of Textile Fibers.—A solution of copper in ammonia is said to be a solvent not only for lignine, and thus for vegetables fibers generally, but also for animal fibers, as wool and silk; forming elastic water-proof substances, and capable of so penetrating one kind of fiber with a solution of another, as to unite certain of their qualities for example enabling cotton to receive and retain the same dyes with woolen, and with a similar tenacity.

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VOL. XVI., No. 5....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, FEBRUARY 2, 1867.

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The SCIENTIFIC AMERICAN has always given prominent consideration to letters from its correspondents, and its columns are open to contributions from practical men upon all matters relating to the arts and sciences. Mechanics not accustomed to write for the papers are inclined to shrink from a task which they deem themselves unfit to perform. This ought not to be. All communications intended for our paper are carefully revised before publication, therefore mechanics need not fear to write to us on any subject that may interest them. We will see to it that their contributions are well prepared for the paper before publication. Send in the documents.

IMPROVEMENTS IN THE MANUFACTURE OF BOILERS.

The English and continental mechanics have directed considerable attention latterly to the improvement of boilers, in their material and method of manufacture. Cast steel has been tried as a material for boilers, particularly those of locomotives, with considerable success. Sixteen locomotives with boilers of cast steel were manufactured during the half year ending 1865 at the works of the Austrian Staatsbahn Railway Company: of these seven were for their own lines, and the rest were delivered for the use of the Ferdinand Northern Railway. All the tests applied to these boilers have given thoroughly satisfactory results, and no fault has yet been found with them. The Ferdinand Northern Railway also ordered last year nine goods-train locomotives with cast-steel boilers, from the engine works of Sigl, in Vienna. It was specified in the order that the engines were to be lightly but very strongly built, and were to be made suitable for burning small coal, the use of which necessitates the employment of boilers having a large heating surface and furnace. Besides these new locomotives, six old ones were reconstructed on the same principles and with cast-steel plates, in the works of the Northern Railway. Eighteen more locomotives for passenger and goods trains are also to be similarly reconstructed during this year at the same works.

Welded boilers are now made quite extensively in England. The Midland Railway Company build all their boilers on this plan. The plates are rolled with thickened edges, the ordinary thickness of seven sixteenths of an inch being preserved in the body of the plate and the edges being thickened to five eighths of an inch, the taper being gradual and extending from the edge back to about four inches. The longitudinal seams of each cylinder of the boiler iron is a lap weld, and the edges of the cylinders are squared up in a lathe, making flush joints, which are covered with welded hoops double riveted. Machinery not essentially different from that in ordinary use is employed to bend the plate, and the welding is accomplished by means of a crane and a curved anvil face, the convexity of which corresponds to the diameter of the barrel. A welding heat is taken on a portion of the seam, the edges of the plate being scarfed down, and the weld is perfected by repeated heatings of successive portions of the joint.

Corrosion of locomotive boilers is a prolific source of deterioration and also of explosions, and this corrosion is generally confined to particular localities, being found around the smoke-box end of the boiler and along the edge of the inside lap of the riveted longitudinal joints. This is to be attributed undoubtedly to expansion and contraction at the longitudinal seams, by which the joints are alternately opened and closed, continually cracking and removing the scale and exposing the iron to further corrosion. It is apparent that if these longitudinal joints could be dispensed with and the substance of the boiler barrel be of a uniform thickness and homogeneousness, the unequal expansion and contraction would be prevented. Such, in fact, has been the result on the Midland Railway, so far as the trials have extended. Experiments as to the strength, also, of the welded joints show that the plate is as strong at the weld as at any other part.

FRICTION WHEELS FOR DRIVING MACHINERY.

To the use of gears there are several objections. They are noisy, have considerable friction, and the cogs are liable to break. Therefore connections are preferably made by pulleys and belts, unless it is absolutely necessary that the connection between the parts and the ratios of motion should be arbitrarily exact. In changing the direction of motion "half-twist" belts or "turned" belts have been largely used; the first when the driver and driven occupy relatively vertical positions, and the latter when they occupy positions on the same horizontal plane. Bevel gears and crown wheels and pinions —the latter nearly obsolete—have also been used; but a recent device which works admirably is the friction wheel. These wheels may be called bevel gear blanks. They are cast in the form of bevel gears, lacking the cogs, and the face of one is turned and polished while that of the other is recessed to receive a smoothly fitted disk of oak-tanned sole leather, which is soaked and pressed to form. The surfaces of these two wheels are brought in contact, when mutual action is the result. One wheel runs in bearings which are suspended on pivots, so that it can, by a lever or any other suitable device, be brought in contact with or receded from the other wheel.

But not always does the mechanic who uses this device understand its proper construction. Not long ago we saw in a large manufactory two of these bevel friction wheels working, the leather covering of one of which had been renewed several times, and our advice was asked. On examination we found that the driver was the solid wheel and the driven the leather covered. The work required was rather too much for the area of the faces of the wheels, and while the driver continued to revolve the driven frequently stopped. Both run at a high velocity, and the result was that the iron-faced driver revolved under pressure against one spot of the stationary driven, cutting recesses across the face of the leather and destroying its perfect circularity. The remedy was simple. The driver should be the leather covered, and not the driven. Then, if the driver continued to revolve while the driven was stationary, the wear of the leather would be uniform, while it could make but little if any impression upon the polished iron. These matters should receive attention from mechanics. Such mistakes are not in any degree creditable.

THE HANDWRITING ON THE WALL.

Uneasy lies the head that wears a crown, and British commercial, manufacturing and maritime supremacy costs its adorers much needful sleep, as well as great annual subsidies from the national wealth. It is a sort of nightmare that gives them periodical gasping fits. Their navy, their coal mines, and now their iron exports, have caused successive spasms within a year or two. Belgium and France are looming up as rivals in iron so formidable as to cause certain well informed English writers to declare that "we are now face to face with the greatest obstruction British industry has ever been checked by. . . . Belgium and France have thrust us out of foreign markets to an extent which the trade will hardly credit." In the Russian market "the Belgian and the Frenchman hold the principal position, and are in a fair way of obtaining an absolute monopoly." Against this alarm a Birmingham paper takes ground by showing from trade returns that the annual export of British iron had more than doubled in fifteen years, and had increased at the rate of one half to three quarters of a million dollars per annum for three years, ending with 1865, when it amounted to $59,784,200. It shows that the export of iron to Russia in ten months of 1866 amounted to 65,211 tuns, being 8,526 tuns more than the average of the last six years; while it asserts that in 1864 France sent no iron to Russia, and Belgium but 3,844 tuns. But in the absence of any statistics of the recent vast growth of the foreign trade in which Britain has gained at the rate of but one per cent. per annum for three years past, or of the progress of her rivals since two years ago, it does not seem that the Birmingham organ has made out a very clear case against alarmists whose responsibility and competency to treat the subject it fully admits.

The truth seems to us to be, that the day when a single imperial city or a little island could sway the destinies of the world and draw all nations around her as dependent and subservient satellites, pertained to the infancy of man, and has forever gone by. Man has come into the rights of his majority, the rights of knowledge and power, in this western republic, and that full age is near at hand for the peoples of Europe. The world is to be a mighty commonwealth, and every sceptre must be broken, whether military, intellectual, manufacturing, or commercial. The drift our cousins are struggling against is irresistible. Britain must resign her extraneous possessions and pretensions, and content herself to subside gradually to the position of a peer, not a prince, among the nations. A fair share of the world for you, neighbor, and welcome; but no more lion's share, in the future.

A NEW FUEL.—At some of the towns on the Western lakes the sturgeons that get too stale for market are sold on the wharves to the steamboat stokers, who thrust them into their furnaces, and add greatly to the fierceness of the fire. Twenty of these large fish are said to be equal to a cord of wood in raising steam.

AMBITIOUS APPRENTICES.

Nothing relating to the management of apprentices is more vexatious to the master mechanic or foreman than the ambition some of them exhibit to be advanced to a higher quality of work than their experience and judgment will warrant. It is eminently proper that the apprentice should have a degree of pride in his occupation and an ambition to become a superior workman, but this is very different from a discontent and dissatisfaction with his proper position. The foreman should be a judge of the attainments of his apprentices as well as of the qualifications of his journeymen, and it is as much his interest to forward the apprentice as it is to the apprentice himself, as fast as it is safe to do so.

Even in the roughest and least delicate manipulations the mechanic's apprentice may learn something. In the work of operating a simple machine which may be almost entirely self-acting dexterity is acquired which can be readily turned to other objects as the novice advances. Experience in the use of the simplest hand tools is acquired only by practice. No amount of oral instruction can ever inform the apprentice as to the proper use of the common cold chisel and hammer. If, for instance, he is employed in dressing castings he must use great care not to mutilate the casting or break the chisel. The experience thus gained is of great value in his after progress. So with every other manipulation upon either wood, the metals, or other materials. Patient plodding, with the exercise of judgment and observation, will in time make the finished workman, and not attempts at fine work without the experience necessary to complete the job in a creditable manner.

GLASS FROM NATIVE ORE.

On the 27th of February, 1866, a patent was issued through the SCIENTIFIC AMERICAN Agency to Richard Washburn, of Monsey, N. Y., for the manufacture of glass from the native ore. This ore, which is really pure glass, or silicate of iron, in a crystallized and hence opaque condition, exists in abundance in many parts of the world, as in the columnar basaltic rock of the Palisades of the Hudson, of St. Helena, and of the famous "Giant's Causeway." But all efforts to utilize it for the manufacture of glass had proved singularly unsuccessful until the invention we have referred to. Messrs. Chance, Son & Co., the celebrated manufacturers of Birmingham, who export great quantities of plate glass to this country, are reported to have expended not less than a quarter of a million dollars, some years ago, for this purpose. It is gratifying to be able to add this important source of wealth to the list of those opened to mankind by American inventive genius, and to record the fact that the Newburgh (N. Y.) Glass Manufacturing Company, organized to work the ore of that vicinity under this patent, are already successfully turning out quantities of glassware with the two peculiarities of unequalled toughness and unapproachable cheapness. The artificial glass hitherto produced, requiring some thirty per cent. of soda or other oxides as a base, consuming much fuel, and losing much dross, evidently could never be cheapened sufficiently for many of the uses for which it is very desirable. The simplicity of this manufacture direct from the native article, the abundance and accessibility of the material, and the extraordinary tenacity of the product—common quart bottles of the Newburgh manufacture may be freely used in driving nails into solid timber without risk to their contents —must eventually extend existing applications of glass in a beneficent degree, and bring it into many uses from which it has hitherto been excluded. The native glass in this region, and in fact generally, being the silicate of iron, has a dark color, and it is yet to be seen how far it can be whitened by modification of the base and admixture of other bases, so as to become available for the finer purposes. That common window-glass may be produced at a great reduction of cost, seems not to admit of doubt, and this alone involves great improvement in the structure of houses, in common horticulture, and in many other respects which will occur to the reader.

We have thought it of interest to numerous readers who may not have turned their attention to the chemistry of glass, to take this opportunity for giving a popular sketch of its character. And first:

WHAT IS GLASS?—Most persons probably take for granted that glass is a simple mineral substance found in the earth, and would be surprised to learn that it is a *salt* formed by the chemical union of at least two and often three or four compound substances, and thus composed of from three to five very different and interesting ingredients. In fact, taking all the varieties of glass in actual use, it may be said to contain a dozen or more ingredients. Now, the popular notion of a salt is derived in part from the usual appearance of that class of substances in crystals, or small angular grains. Glass does not appear in that form, for the same reason that hot maple syrup, or any other melted sugar, "waxes" or candies when poured upon ice, as many of our readers may remember treating it in younger days in the maple orchards of New England. The reason is that, being cooled suddenly from the boiling point, the atoms are not allowed time to segregate and settle themselves into individual crystals, according to their natural disposition, but are overtaken by solidity as they are, in a single unitary mass. Suffer molten glass or any other salt to cool slowly enough, and its atoms will group themselves in multiplied units instead of one, forming a semi-opaque and crumbling mass: a striking instance and illustration in the lowest sphere, of that union of the kind and the individual which pervades the universe, from grains up to worlds and from cell-life up to that of immortal spirits. Another part of the popular notion of a salt is derived from the ready solubility of most salts, and their consequent pungent effect upon the

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tongue. Glass is considered almost a synonym for insolubility; and yet it has all degrees of solubility according to its composition, and there is a kind of glass, differing from the common article only in the proportions in which the ingredients are combined, which will dissolve in water like any other salt, and not only yields a strong alkaline taste to the tongue, but will also wash the hands, if you please, of dirt and skin at once. It is sometimes used in making soap, but in Prussia this is prohibited, on account of its destructive effect upon textile fabrics. Hence we may understand the taste of a glass tumbler, although we can get at it only by imagination because the substance is too hard to dissolve on the tongue.

But again, more particularly, what is glass?—Silicon, oxygen, and any metal or metals the maker chooses, according to the color or hardness he wishes to produce: the metals being necessarily taken in their oxides—of which that of sodium (soda) and that of potassium (potash) are most used—and the silicon also in its combination with oxygen, with which its quick and tenacious affinity for that element keeps it always united, forming silicic acid. Most persons who have observed rock crystal or quartz, everywhere veining or specking the rocks, or gleaming in sand, wherever sand is washed clean, have as little suspected that this apparently tasteless because almost utterly insoluble substance is an acid, as that glass is a salt. It is silicic acid, or one part of silicon with three of oxygen. The base silicon, like boron (to the analogy of which to carbon we referred in an article on borax) becomes a wonderfully interesting substance under the light of "chemic fire." From what has just been said, it is apparent that silicon is the main characteristic constituent of the inorganic earth, as carbon is of the animal and vegetable kingdoms. It is capable of the three allotropic conditions of boron and carbon, described in a former article, and is only hardened by the action of heat, unless exposed to air or oxygen, in which it takes fire and burns superficially; the silicic acid formed on the surface protecting the mass from oxidization. Silicic acid, silica, or quartz, can be melted by nothing short of the oxy hydrogen blow pipe; but when heated with metallic oxides, the silicates resulting from union with those substances are melted at various temperatures, according to the metal involved, and the result is glass.

We might go on to describe numerous beautiful forms besides common quartz, in which silica presents itself in nature, such as opal, amethyst, chalcedony, cornelian, onyx, sardonyx, agate, and others, which owe their brilliant variety to various tinging materials, chiefly oxides of iron and other metals. Besides these, it is the stiffening in the framework of plants and leaves and animal cartilages. But as our object in setting out was merely to define the nature of glass, we close with a mere reference to the principal metals used in producing the usual varieties of that "salt."

What may be termed the highest variety of glass, is the *strass*, or "paste," used in imitation of precious stones. This is made with potassa and oxide of lead: the latter metal being remarkable for the high lustre, refractive power or brilliancy, specific gravity and softness, which it gives to the silicate. These qualities appear to be proportioned to the atomic weight of the bases employed, that of lead being among the greatest. Flint glass and crystal for optical purposes, are of like composition with strass. Common window glass and English crown, are silicates of potassa or soda, lime and alumina. Plate glass differs from this only in the purity of the materials. Oxides of gold, silver, copper and other metals, are employed to impart a variety of brilliant colors. The native glass which gives occasion to this article, as we have observed, is silicate of iron, with some added mixture of alkalies, alumina, or other "fluxes" (bases) of which we are not precisely informed, but which are among the usual elements of green bottle glass

FRICTION OF ROLLING STOCK.

A series of practical experiments of great importance to railroad men, were inaugurated on Wednesday, Jan. 16th, on the New Jersey Central Railroad. The trials were made by Mr. Wm. Loughridge, of Paterson, N J., under the patronage of some of the leading railways of the country, who have appropriated funds for the purpose of investigating the laws of friction in their practical relation to rolling stock. Many circumstances made it impossible on this occasion to obtain very accurate results, but the mode of operation was shown, and a report of careful experiments now being conducted, was promised at some future time.

The programme for the day's proceedings embraced the solution of nine problems, including the testing of wrought, cast and chilled iron and wooden shoes under the same pressure against the wheels, to determine which will produce the greatest retarding effect on the car. Applying different pressures on the several shoes and noting if the retarding effect is proportional to the weight of the car, and if the same at all velocities. Also whether the resistance is in proportion to the pressure on the brakes. Determining by means of a dynamometer the average strength of brakemen. The resistance of journals, or the power required to start a car, or several coupled together. Observing in a moving train whether a car or train has a retarding power with it, proportional to its weight, when the brakes are applied in proportion to the weight of the car. Lastly, the determination of the effect of using different sized journals. As intimated above, the results were not perfectly satisfactory, but we have been promised a full copy of the final report, and will then present to our readers a full solution of these important problems.

Mr. Loughridge is the inventor of a steam brake giving the engineer complete control over the train, which he can stop almost instantly even when under full head of steam. The locomotive has a small cylinder secured under the foot board, the piston of which works the brakes and steam is admitted directly from the boiler. The length of stroke is augmented by a combination of pulleys, and by a series of rods and chains under the cars all the brakes are operated simultaneously, and the braking up of the train is accomplished, by the movement of a lever. In case of any derangement interfering with the working of the steam brake, hand power can be applied and the train stopped as usual. In several trials made the other day, a full train of five cars running at the rate of thirty miles per hour, was brought to a dead halt in thirty seconds. By a simple contrivance, the amount of brake pressure which can be applied to the wheels is regulated, being greater in a heavy train, and so changed in a light train that the sliding of wheels is a thing absolutely impossible.

The experiments were witnessed by engineers and master mechanics from various parts of the country. Unavoidable delays, and the necessity of leaving the tracks open for the regular trains, prevented the completion of all the proposed trials at the time. The remainder were promised to take place upon the following day, but the severe storm caused an indefinite postponement of the public trial.

Science Familiarly Illustrated.

Under this caption we propose, occasionally, perhaps weekly, to publish facts well known to scientists and experienced mechanics but not familiar to the juvenile portion of our readers. We are daily in receipt of letters from young persons—mechanics' apprentices and workmen—soliciting replies to them which it is hardly appropriate to place in the column usually devoted to replies to correspondents. These requests imply a want of the information which is possessed by experienced mechanics and scientific students, and an ardent desire to understand those fundamental truths which lie at the foundation of philosophy. As our object in the issue of the Scientific American is to educate, elevate, and improve those who are to become the pioneers of material progress, as well as to note the improvements now being made in the domain of physics, we deem it but proper that a portion of our columns should be set apart for the instruction of the younger and less experienced of our readers.

Suction.

Suction is a common term applied to the force of the atmosphere, and is simply weight or gravitation. Air, however, unlike some more solid substances, acts equally in every direction, up or down having no influence on its action. By the way "up" and "down" are simply relative terms, having no absolute signification, but meaning simply toward or from the surface, or rather the center of the earth. The atmosphere which surrounds the earth exerts a pressure on it and every object upon it of about fifteen pounds to every square inch exposed to its action. Now, then, if the air can be kept from acting on the under surfaces of bodies they would adhere to whatever surface they were placed upon and would stick or "suck," so that the object, if not too heavy, could be lifted. Boys frequently cut out disks or circular pieces of leather and put a string through their centers by which to lift them. The leather being moistened with water can be pressed upon a smooth surface, and the edges adhering airtight prevents the atmosphere from acting on the under surfaces. By this simple device we have seen a common bucket, full of water, lifted with a "sucker" of only about four inches diameter. It was done by the pressure of the atmosphere on the upper surface of the disk, amounting in the aggregate to over one hundred and ninety pounds, as the area of a disk four inches diameter is over twelve and a half inches, each inch sustaining the pressure of fifteen pounds.

So the water in the pump barrel is elevated by the pressure of the atmosphere on the surface of that on the outside of the pump. The upward movement of the plunger containing an upward lifting valve, draws or lifts the air out of the barrel between the plunger and the fixed valve near the bottom of the barrel. This creates a vacuum more or less perfect, and the pressure of the atmosphere on the outside water forces the liquid up through the fixed valve into the pump barrel.

The sucking of cider through a straw, which every boy who lives in the country has often done, is another exemplification of this same property in the atmosphere. The boy inserts one end of the straw into the cider, and with his lungs draws out the air, when the atmosphere at once lifts the cider up through the tube. If the straw was secured air-tight in the barrel and no atmosphere admitted, or if the pump well was so covered in that no air could have access to the water, "suction" would be merely a name without any reality.

Extension of Patents.

Many valuable patents are allowed to expire every year for the want of a little care on the part of patentees in not applying for an extension. The petition must be filed in the Patent Office at least ninety days before the expiration of the patent, which gives time for the preparation of testimony. Inventors who have patents dated in 1853 and who may wish to have them extended for seven years, can receive all necessary advice how to proceed by addressing Munn & Co., this office.

American Inventions in Europe.

American inventors are taking a renewed interest in patenting their valuable inventions in European countries. As an evidence of the fact we may state that since January 1st we have entered twenty-three foreign applications upon our records. Parties wishing to take foreign patents can, through our Agency, depend upon prompt and careful attention to their interests.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JAN. 15, 1867.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the Scientific American, New York.

61,133.—Mode of Finishing Tools, etc.—John Allen, New York City, and Gaston D. Smith, Washington, D. C.

First, We claim the finishing devices of machinery, engines, sewing machines, tools, etc., instruments of all descriptions, by the mode and means hereinbefore described, and for the purpose of preserving them from damage by oxidation or corrosion, as set forth.

Second, The restoration of damaged tools and machinery to good condition by the method and means set forth.

61,134.—Drill.—Leonard Andrews, Biddeford, Me.

First, I claim the combination of the tube, a, rod, b, ring and springs, e f, horizontal cutters, g g, as and for the purpose set forth.

Second, The combination of the double drill, fig. 5, constructed as described, with the tube, r, as and for the purposes specified.

61,135.—Turning Lathe.—Frantz A. Armbruster, New York City. Antedated Jan. 3d, 1867.

First, I claim the oscillating spindle, E, in combination with the chuck, I, carrying one or more tools, and with the longitudinally-sliding back center, F, constructed and operating substantially as and for the purpose described.

Second, Controlling the oscillation of the spindle, E, by means of the chain, c, and adjustable cranks, e, substantially as and for the purpose described.

Third, Giving the oscillating motion to the cutter head by means of two shafts, I i', carrying the cranks, e, and chain, c, substantially as and for the purpose set forth.

61,136.—Apparatus for Bundling Scrap Metal.—Lewis J. Atwood, Waterbury, Conn.

I claim the bundling or consolidation of scraps of sheet metal, by the means and substantially as set forth.

61,137.—Water Elevator.—W. E. Babcock, East Pembroke, N. Y.

I claim the drum, A, shaft, B, the head, C, the ratchet cone, e', and the spiral spring, o, when arranged and combined substantially as described for the purposes herein set forth.

61,138.—Cattle Tie for Stalls.—Cyrus M. Baker, Bingham, Me.

I claim the tie chain herein described, the same consisting of the bar, B, chains, D and E, and rings, G G, when all connected together, so as to be used for the fastening or hitching of cattle and other animals, substantially as described.

61,139.—Photographic Camera.—Thomas Barbour, Boston, Mass.

First, I claim the arrangement of the plate, f f, racks, g g, pinions, h h, rod, i i, wheel, k k, and adjustable arm, p p, as hereinabove described and for the purpose specified.

Second, Arranging a case upon a pivot so as to turn thereon, in combination with suitable stops, as herein described and for the purpose specified.

Third, The use of the lever, e e, for elevating and depressing the case, as described.

Fourth, The use of the movable plate or frame, f f, operating as described and for the purpose specified.

61,140.—Apparatus for Making Envelopes.—E. L. Barrett, Springfield, Ohio.

First, I claim the plates, e f and g, in combination with the slides, a a', substantially as and for the purpose set forth.

Second, The stop, c, gage, d, in combination with the slide, a', and plate, f, substantially as and for the purpose specified.

Third, Pivoting or hinging the plate, g e f, to the slides, a a', substantially as and for the purpose described.

Fourth, The skirter, M, fig. 7, constructed and operating as and for the purpose substantially as set forth in the herein described process of making envelopes.

61,141.—Valves of Steam Engines.—Louis D. Bartlett (assignor to the Putnam Machine Company), Fitchburg, Mass.

I claim the arrangement of the casings, steam passages, and valves, within the steam chest, in relation to each other and operating substantially as described.

61,142.—Neck Yoke.—Alonzo Benedict, Jonesville, N. Y.

I claim the curved or U-shaped metallic bars, D D, attached to the neck yoke by means of clips, C C, and grooved at their inner parts to receive and clamp the chafing leather, E, substantially as herein shown and described.

61,143.—Mode of Protecting Armor Plates.—Mayeul Bernabe, Toulon, France.

I claim the herein described method or process of covering the steel, iron, or cast-iron plates, with an insulating and protective coating of copper for neutralizing the electric currents and rendering the plates inoxidizable.

61,144.—Apparatus for Charging and Drawing Gas Retorts, etc.—Sealy James Best and James John Holden, London, England.

We claim the apparatus and machinery, substantially as herein described.

61,145.—Wool Dryer.—Carl Beu, Dessau, Dukedom of Anhault Dessau. Antedated Jan. 2, 1867.

First, The arrangement of a series of drying boxes, placed one above the other, in a suitable case, A, in combination with a suitable mechanism, whereby an automatic downward motion is imparted to said boxes, substantially as and for the purpose set forth.

Second, The recesses, t, in the drying boxes, f g h, etc., in combination with the cams, q, constructed and operating substantially as and for the purpose set forth.

Third, The stop motion, a' b' c', in combination with the drying boxes, f g h, etc, constructed and operating substantially as and for the purpose described.

61,146.—Sprinkler for Clothes and Flowers.—Dana Bickford, Boston, Mass.

I claim the combination of the elastic bulb, A, the valve, B, the perforated nozzle, c, all constructed as and for the purpose specified.

61,147.—Rudder Bearing.—Joseph N. Bitting, Sr., Camden, N. J.

I claim the projection, c, on the rudder post, in combination with the plate, D, and its inclined recess on the edge, when the latter and the said projection are formed in relation to each other, as described.

61,148.—Apparatus for Storing Petroleum and other Inflammable Liquids.—Felix Bizard and Pierre Labarre, Marseilles, France.

We claim, First, An oil tank of ordinary or suitable construction, provided at the top thereof, with a pipe through which said tank is supplied with or discharged of oil, in combination with a pipe, also passing through the top, into and down to near the bottom of said tank, said pipe being branched and provided with cocks and level indicator for regulating the flow of water to and from the tank, in the manner and for the purpose set forth.

Second, The combination, in an oil tank or reservoir, of an elevated manhole and pipes connected therewith for supplying or drawing off the oil to or from the tank at a point higher than the top or dome of said tank, as herein shown and described.

Third, In combination with the arrangement claimed in the last preceding clause, we claim the level indicator, when constructed to operate in the manner substantially as described.

Fourth, The channel or depression formed in the bottom of the reservoir for receiving and collecting the sediment, and facilitating the entrance to the dome, substantially as specified.

61,149.—Brick Kiln.—George C. Bovey, Cincinnati, Ohio.

I claim a brick kiln entirely open at top and provided with folding covers, substantially as and for the purposes set forth.

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61,150.—DEVICE FOR PLANTING HEDGES.—C. D. Brown, Sterling, Ill.

I claim, First, The employment of clamping beams, A A, and post, B B, in the operation of planting hedges, substantially as described.

Second, Providing for adjusting the beams or clamps, A A, vertically as well as horizontally, substantially as described.

61,151.—SULKEY PLOW.—George Burket and Samuel M. Gaskill, Bluffton, Ohio.

We claim, First, The attaching of the rear part of the plow beam by a chain or rope, b, to a pulley, d, on a shaft, H, on the hounds, a a, of the draft pole, said shaft, H, having a lever, I, attached, and all arranged substantially as and for the purpose specified.

Second, The slotted plate, K, attached to the platform, D, in such a manner that it may be turned forward to embrace the plow handle so as to serve as a bearing or fulcrum for it, and be turned backward free from the plow handle when it is necessary to liberate the latter, substantially as set forth.

61,152.—LAMP.—Francis Burrows, Peoria, Ill.

First, I claim the chamber, C', formed in the manner herein described, and adapted for the reception of water to prevent the heating of the reservoir, as and for the purpose explained.

Second, I claim the combination and arrangement of the reservoir, A, two-part wick tube, D D1, and casing, C1 C2 C3, with their several adjuncts, applied and operating in the manner and for the purpose explained.

61,153.—SEED PLANTER.—John W. Buttrick, Farmington, Wis.

I claim, First, The cam, Z, when constructed and used substantially in the manner and for the purpose set forth.

Second, The combination and arrangement of the cam, Z, feed bar, Q, spring, P, and part, M, substantially as and for the purpose set forth.

Third, The combination and arrangement of the cam, Z, feed bar, Q, and shut-off lever, K, substantially as and for the purpose set forth.

Fourth, The combination of the wheel, A', constructed with the cam, Z, and pins, c, and the brake, G', and operating lever, I, when constructed and used substantially as and for the purpose set forth.

Fifth, The combination and arrangement of the shovels, U, and operating bars or levers, R and M, substantially as and for the purpose set forth.

61,154.—CASE FOR PEN AND INK.—A. G. Buzby, Philadelphia, Pa.

I claim the pen, B, with its flange and collar, a, and button, c, and the case, A, with the cover, A', and operating for the reception of the pen, the whole being constructed as described.

Second, The cover, A', with its cap, d, and recess for the reception of the bottle, D, in combination with the case, A, and its pen, B, as set forth.

61,155.—PUMP VALVE.—Adam S. Cameron, New York City.

First, I claim a valve composed of a metallic case, A, in which india-rubber or other suitable material, B, is confined so as to form faces, a b, to operate in combination with the seat, C, substantially as and for the purpose described.

Second, A valve formed by putting the rubber into the case or recess in a plastic state, and vulcanizing it therein, substantially as and for the purpose specified.

61,156.—PEN.—R. M. and D. Cameron, Edinburgh, North Britain.

We claim the construction of pens possessing the improved qualities in the manner substantially as hereinbefore described and shown in the accompanying drawings.

61,157.—TRUNK.—Lazare Cantel, New York City.

I claim the grooved wooden frames, c d, secured to the edge of the trunk, or similar article, by the bands, e and f, and hinge, h, and suitable nails, in combination with the elastic strip or pipe, i, as and for the purposes specified.

61,158.—RAILROAD RAIL.—Robert Chambers, Cincinnati, Ohio.

I claim, First, The compound railroad rail, A a c A' a' c' B b, secured or locked together by the same spike or spikes which fasten the rail to the sleeper or crosstie, substantially as set forth.

Second, In combination with the aforesaid compound rail I claim the single-lipped chair, E e.

61,159.—COTTON AND HAY PRESS.—Nathan Chapman, Milford, Mass.

I claim traversing and holding the ratchet rods which work the follower by the stationary locking boxes, P P, provided with ratchet wedges or pawls, and connected by vibrating links and crank rock shafts to traversing locking boxes, N N, provided with ratchet wedges or pawls to work the press by levers inserted in the holes in the rock shafts and vibrated.

I claim the four arms on the follower, extending through the press box and fastened to the ratchet rods working at the corners of the press.

I claim the use of four rods, or one at each corner of the follower, to move it even and keep it from tipping.

61,160.—CHURN.—James M. Chritton, Joliet, Ill.

I claim the water pockets, e, in combination with the movable box, d, the movable pinion and shaft, b, and the air tubes, f and g, when constructed and operating substantially as described.

61,161.—CAN OPENER.—S. O. Church (assignor to himself and S. S. Wilcox), West Meriden, Conn.

I claim the lever, A, provided with a fulcrum, a, in combination with a hook, C, and the handle, B, constructed and arranged so as to operate in the manner described.

61,162.—STEAM GENERATOR.—Mirtillow R. Clapp (assignor to himself and E. P. Jones), New York City.

First, I claim the water and steam generating tubes, G, exposed to the action of the fire or heated gases, as specified, and provided with diaphragms, g, having openings, s, in them inclining downwardly, substantially as and for the purpose or purposes herein set forth.

Second, The construction of the diaphragms, g, within the tubes, G, whereby they support or retain each other in place, as described.

61,163.—CRACKER CRUSHER.—Arthur Clarke and Thomas Reece, Philadelphia, Pa.

We claim the arrangement of section, B, with its perforated or bottomless cup, C, and ribs, a, or their equivalents, and section, A, with the flange, D, and ribs, b, or their equivalents, both of said sections having suitable handles, and hinged together in either of the modes herein described, and operating substantially as and for the purposes set forth.

61,164.—BEEHIVE.—Orson Colvin, Belvidere, Ill.

First, I claim the inner case, B, provided with inclined sides, a a, and a perforated top piece, c, in combination with an outer box, A, to receive, B, with an air space allowed between, and the ventilating openings, j m, in the box, A, substantially as and for the purpose set forth.

Second, The spare box, C, with perforated bottom, registering with the perforated partition plate, e, and with the perforated top piece, C, in combination with the case, B, with perforated sides registering with the perforated spare boxes, D, whereby air will be admitted into all parts of the hive, in the manner described for the purpose specified.

61,165.—MILKING STOOL.—David Connor, Fulton, Ill.

I claim the circular frame, F, bench, H, and seat, A, when constructed, arranged, and operating substantially as and for the purpose set forth.

61,166.—TOOL REST FOR LATHES.—T. J. Currier and A. M. Black, Worcester, Mass.

We claim the combination with the poppet block, A, of the tool rest, D, shaft, H, and screw, G, substantially as set forth,

61,167.—JET CONDENSER.—J. P. F. Datichy, West Hoboken, N. J., assignor to himself and John H. Bonn, Hoboken, N. J.

I claim a condenser composed of three compartments, A B F, valves, a a M, rose, C, and connecting pipes, E G I, all constructed and operating substantially as and for the purpose described.

61,168.—FAGOT FOR RAILROAD RAILS.—Herbert Davis, Troy, N. Y.

I claim the rolling or making of rails for railroads of a pile composed of a series of iron bars, A, provided with a steel cap, B, formed or rolled with a pendent flange at each side, and with longitudinal grooves and projections, e b, at its under surface, and the upper iron bars of the pile rolled or formed with corresponding grooves or projections, a d, to admit of the steel cap and upper iron bars being locked together, substantially as shown and described.

I further claim forming the iron portion of the pile of bars, A A', of superior and inferior iron, arranged or disposed substantially in the manner and for the purpose set forth.

61,169.—HOOP SKIRT.—Thomas B. De Forest, Birmingham, Conn.

I claim protecting the attachment of the lower hoop to the tapes by extending the tapes below the bottom hoop, and covering this extension with metal, substantially in the manner and for the purpose specified.

61,170.—HOOP SKIRT.—Thomas B. De Forest, Birmingham, Conn.

I claim attaching a cord to skirt wire outside the covering which incloses the wire, substantially as herein set forth.

61,171.—BINDING FOR SKIRTS.—Thomas B. De Forest, Birmingham, Conn.

I claim a binding having one edge protected substantially as described, as a new article of manufacture.

61,172.—BINDING FOR SKIRTS.—Thomas B. De Forest, Birmingham, Conn.

I claim a binding presenting an india-rubber or similar flexible edge, substantially as herein described, as a new article of manufacture.

61,173.—MANUFACTURE OF RUBBER BELTING.—George Pomeroy Dodge, London, England, assignor to Nathaniel Shattwell Dodge, Washington, D. C.

I claim the mode of manufacturing bands or belts composed of fabrics and gum or sticky substances, substantially as herein described.

61,174.—VULCANIZING FLASK FOR DENTISTS.—Levi W Dowlin, Sherbrooke, Canada West.

First, I claim the employment of the middle part, B, of the flask, substantially as and for the purpose herein specified.

Second, I also claim the separate union of the parts, B and C, before the rubber is packed in by means of screw bolts, h h, or their equivalent, substantially as and for the purpose herein set forth.

Third, I also claim the combination and arrangement of the counter die part, A, with the parts, B and C, substantially as herein specified.

61,175.—STEAM-PUMP VALVE GEAR.—George Doyle, Worcester, Mass.

First, I claim the arrangement of the spring, h, the dogs, j j, and the lugs, i i, on the valve stem, substantially as and for the purpose specified.

Second, I also claim the arrangement of the dogs, j j, for putting tension on the spring by restraining it during the stroke or part of the stroke of the piston, substantially as and for the purpose specified.

61,176.—SEWING MACHINE.—Jehiel C. Driggs, New York City, assignor to Matthew T. Higgins.

First, I claim the combination in needle-feeding machines of the horizontally-slotted arm, G, operated by a crank or eccentric pin, D, and carrying the vertically-slotted needle arm, H, with its adjustable branch and spring, J, and rotating cam, F, for giving to the needle its two-fold motion, substantially as specified.

Second, The combination with a needle working from below up through the table, of a looper, L, above the table, acted upon by a spring, q, and guide, p, and pivoted to a rod or arm, o, radiating from a rocking shaft, M, essentially as herein set forth, and for the production of a single thread or chain stitch.

61,177.—DEVICE FOR PROTECTING TREES FROM THE BORER.—George W. Dudderar, Unionville, Md.

I claim the application of an adjustable appliance to the trunks of fruit trees to protect them, as herein described, using for that purpose the aforesaid cylinder and oil-cloth top or addition, or any other substantially the same, and which will produce the intended effect.

61,178.—HEAD BLOCKS FOR SAW MILLS.—J. W. and W. Ebert, Zanesville, Ohio.

First, We claim providing for adjusting knees upon head blocks by means of rectilinear reciprocating pawls, which are allowed to vibrate vertically, in combination with a lever, H, which will admit of said pawls being engaged with or disengaged from their knees at pleasure, substantially as described.

Second, The locking plates, J J, applied so as to take into the racks of adjustable knees of head blocks, substantially as and for the purpose described.

Third, The construction of the bar, H, substantially as and for the purpose described.

Fourth, The combination of the locking plates, J J, or their equivalents, with rack, D, upon the knees, C C, and with the bar, H, which raises and depresses the pawls, b b, substantially as and for the purpose described.

Fifth, The combination of the pawls, b b, arms, b' b', and angular lever, c c, with the reciprocating bar, E, and a lever, whose movements are regulated by adjustable stops, f f, substantially as and for the purposes described.

61,179.—CONVERTING MOTION.—Augustus Eckbert, Trenton, Ohio.

I claim the lever, C, with its nose, c, pivoted at one end to the link, 1, and to the other end to the pendulum, D, connected by the rod, h, to the elbow lever, e f, having its fulcrum on the stationary hanger, operating in combination with the escape wheel, B, with pins, b, in the manner described for the purpose specified.

61,180.—RAILWAY-CAR AXLE.—Albert E. Elmer, Greenfield, Mass.

I claim my improved railway carriage axle, made as described, iz.: with the concave and convex shoulders, d e, arranged and combined with the tubular and cylindrical parts, a b, and with respect to the wheels, substantially as described.

61,181.—STEAM GENERATOR.—John R. Fish and H. C. Hartman, Fort Wayne, Ind.

First, We claim the heater, B, when placed inside the fire box of a tubular or flue boiler, in such a manner as to be exposed to the direct action of the fire before the heat passes through the flues of the boiler, in combination with the pipe, C, and the check valve, C,' and pipe, D, arranged substantially as set forth.

Second, In combination with the heater, B, we claim the blow-off pipe, E, arranged substantially as and for the purpose set forth.

61,181.—MACHINE FOR FINISHING LEATHER.—Edward Fitz-Henry and Isaac Ball, Portland, Oregon.

First, We claim the set screws D', and rod, D, with the springs, E, substantially as and for the purpose set forth.

Second, We claim the plate, B, pivoted to the plates, A, so as to communicate motion to the rubber centrally, and without pressing upon the springs attached to the slickers.

Third, In combination with the plate, B, we claim the rods, G, and pins, G', for the purpose of raising the slickers and brushes when not in action, substantially as set forth.

Fourth, We claim the jaws, F and I, hinged substantially as set forth, in combination with the hair spring, I, substantially as and for the purpose set forth.

Fifth, In combination with the jaws, F, we claim the springs, K', and brushes, K, substantially as set forth.

Sixth, We claim the cleaner, S, in combination with the slickers, F', operating substantially as and for the purpose set forth.

Seventh, We claim the lever, L, and notched plates, O, or the equivalent, in combination with the rods, G, attached to the jaw, F, substantially as and for the purpose set forth.

Eighth, We claim the arrangement of the points, M', so as to permit the raising of one or all of the rubbers, substantially in the manner and for the purpose set forth.

61,183.—DEVICE FOR FORMING HASSOCKS OR STOOLS.—John G. Flagg, Philadelphia, Pa. Antedated Jan. 10, 1867.

I claim an apparatus for making hassocks, consisting of the screw, D, disk, E, mold, F, and a suitable frame, all arranged and operating substantially as herein specified.

61,184.—METHOD OF ATTACHING ROOFING TO BUILDINGS.—Lorenzo D. Ford, Canaan, Columbia County, N. Y.

I claim the connecting of the edges of the sheets or strips of plastic roofing by means of a lock joint, formed by bending the edges or selvedges of the fabric, substantially as shown and described.

61,185.—DOOR BOLT.—Benjamin E. Fowler, Hartford, Conn.

I claim the rack bolt, b, in combination with the pinion, e, spindle, d, pin and groove, h g, substantially as and for the purpose described.

61,186.—PRINTING PRESS.—James H. Frey and William Heckert, Sharon, Pa., assignors to themselves and E. A. Wheeler.

First, We claim so constructing and operating the platen, B, that it shall move bodily in a right line up to and from the form bed, C, and also assume an inclined position when at the termination of its outward stroke, the said platen performing these movements without revolving, substantially as described.

Second, Supporting and guiding the platen, B, by means of four bearings, a a a' a', which move in slots, a2, substantially as described.

Third, Communicating motion in opposite directions to the plates of the plates of the inking table, and also a separate and independent motion to either of the plates, e e', at will, all by means substantially as described.

Fourth, Communicating motion to the rock shaft of the inking roller arms, c c, by means of segments, b b, which are on a crank, E', that is connected to the shaft, D3, substantially as herein described.

Fifth, Providing for giving a rapid and slow motion to the platen and its appendages by the employment of two cranks, in conjunction with the treadle and its rod, either of which cranks will communicate motion to the shaft of the crank wheels, D1 D2, substantially as described.

61,187.—PAPER PANTELET.—Edward P. Furlong, Portland, Me., assignor to himself and Henry Inman.

I claim a paper pantalet constructed and applied to drawers, substantially as described.

61,188.—CARRIAGE BOOT.—P. Tenny Gates, Plattsburgh, N. Y.

I claim, First, The boot, A, constructed substantially as described, and used as and for the purposes herein set forth.

Second, The dash cover, provided with its flaps, D, and straps, d, constructed as set forth and used as specified.

Third, The combination of the dash cover, C, and boot, A, when formed as herein fully described, and used with the dash of a vehicle either stationary or adjustable, in the manner and for the objects described.

61,189.—HOG PEN.—Burton Gifford, Pedee, Iowa.

I claim, First, Attaching the trough to the outside of the pen, with graduated openings leading into it from the inside of said pen, substantially as herein shown and described.

Second, The combination of the hinged cover, G, chains or cords, H, and sliding board, J, with the trough, E, and with the perforated side of the pen, substantially as herein shown and described.

Third, Forming a portion of the bottom or floor, B, of the pen of slats, or with slots, substantially as herein shown and described and for the reason set forth.

Fourth, The combination of a removable box, D, with the slotted portion of the floor, B, substantially as herein shown and described, and for the purpose set forth.

61,190.—SHEEP PEN.—Burton Gifford, Pedee, Iowa.

I claim, First, Forming a feed box, D, upon, or attaching it to, the outside of the sheep pen, A substantially as herein shown and described.

Second, The combination of the sliding board, H and G, and levers, L, with the feed box, D, substantially as herein shown and described.

Third, The combination of the adjustable board, J, with the sliding boards, H and G, and with the feed box, D, substantially as herein shown and described.

Fourth, Connecting the feeding trough, B, with the feed box, D, by the spout or channel, F, substantially as herein shown and described.

61,191.—MACHINE FOR SOLDERING EAVE TROUGHS.—H. C. Hatten and J. P. Angleberger, New Carlisle, Ohio.

We claim a reversible frame for soldering eave troughs, constructed and arranged for use substantially as set forth.

61,192.—BUCKLE.—J. B. Hawley, New Haven, Conn.

I claim a buckle constructed substantially in the manner herein described, combined with a hook or eye, substantially as herein fully set forth.

61,193.—SKATE.—William W. Hendricks (assignor to The Cooper Fire Arms Manufactory) Philadelphia, Pa.

I claim the combination and arrangement of the plate, A, the lever jaws, D D' E and E', with their lugs, d e, and the straps F and F', or equivalent devices for operating the said levers beneath the plate, A, the whole being constructed and operating as and for the purpose described.

61,194.—MATERIAL FOR STUFFING MATTRESSES AND FOR OTHER PURPOSES.—H. R. Hildreth and W. H. Smith (assignors to H. R. Hildreth, George B. Hobbs and John Dibblee) Dutch Flat, Cal.

We claim as a new article of manufacture, and as a substitute for the ordinary curled hair, the fibre of the soap plant when properly heated and manipulated therefor.

Treating the fibre of the soap plant, substantially as herein described and for the purpose specified.

61,195.—CORN PLOW.—John Hindmarsh, Henry, Ill.

First, I claim the lever, N, in combination with the standard, O*, for sustaining the plow in an elevated position when required.

Second, The rods, O O, plow beams, G G, cross bar, P, and screw, Q, combined and operating as described.

Third, The combination of the plow beams, G G, standards, L L, lever, N, and brace rods, j, all arranged and applied to a mounted frame, A, to operate in the manner substantially as and for the purpose specified.

61,196.—ARTIFICIAL SLATES.—Henry W. Holly and Sidney L. Geer, Norwich, Conn.

First, We claim the use of liquid silex as a menstruum or binding material in liquid slating.

Second, Liquid slating, composed of the ingredients specified in or about the proportions set forth.

61,197.—SMOKING STAND.—John Holmes, New York.

I claim a smoking stand constructed as herein shown and described.

61,198.—SAD IRON.—Phineas B. Hood, Milford, N. H.

I claim a sad iron, composed of a metallic face, and with a body of soapstone, when constructed and arranged substantially as herein shown and described.

61,199.—PUMP VALVES.—Wm. D. Hooker, San Francisco, Cal., assignor to himself and Volney Cushing.

I claim the valve, A, constructed with guides, b b b b, upon its sides, arranged substantially as described and for the purpose set forth.

61,200.—FILTERING, EVAPORATING AND GRANULATING SACCHARINE LIQUIDS.—James R. Hopkins (assignor to himself and Jacob O. Joice, Dayton, Ohio.

First, I claim the evaporator lid or cover, A, as described and for the purposes set forth.

Second, The mode herein described for filtering and purifying the juice, in combination with the granulating process, substantially as and for the purposes set forth.

Third, The mode herein set forth for producing granulation, in combination with the evaporator lid, A, and the filtering process, substantially as described.

61,201.—SEEDING MACHINE.—Benj. F. Horton, Ithaca, N. Y.

First, I claim the combination and use of the stationary bar, C, with the two movable bars or slides, B B, when made as described, and the use therewith of one or more series of studs in the opening between the bars, or immediately connected with the said opening.

Second, I claim the bars, B B, when held in constant parallelism with each other by means of the rods, H H H, thus securing a uniform and adjustable opening between the bars, and the even sowing of the seed; and I claim the set clamp, I, and its set screw, J, for the purpose of adjusting the opening for the sowing of various seeds or article.

Third, I claim the arrangement of the studs, G, one series on the fixed bar, C, and at least one on the vibrating bars, B B.

Fourth, I claim the combination of the wheeled carriage, the cam, E, seed box, vibrating bars, stationary bars, gear lever, when made as described, the same constructing one whole or machine.

Fifth, I claim the making of the zigzag cam adjustable by set screws, so that it can be applied to the wheels of the horse rakes, and the use of my machine in combination with the wheels and carriage of horse rakes, as shown and described.

61,202.—FLOORING FOR MALT KILNS.—Wm. W. Hughes, and James C. Adams, Philadelphia, Pa.

First, We claim constructing malt-kiln floors of perforated flanged plates, extending over two or more joists stiffened by the side bars or clips, G H, and the transverse bars or strips, J K, the flanges of said plates being also secured together by pin bolts or rivets passing through the contiguous flanges.

Second, We claim securing the flanged plates, constructed as above described, to the iron joists below by means of clips, m m, and wires or their equivalents.

61,203.—PLOW.—William S. Huntington, Byron, Mich., assignor to himself and C. P. Devereaux, North Newburgh, Mich.

I claim the iron elbow scraper, a, suspended to the beam, A, of a plow, in combination with the drawing rod, b, arranged and operating substantially as and for the purpose herein described.

61,204.—REGULATORS FOR WATCHES.—J. Little Hyde, New York City.

I claim so constructing the index and scale of the regulator that the edge of the index shall form such an angle with the lines of the scale that one of the said lines shall always be but partially covered by the index, substantially as herein described for the purpose specified.

61,205.—SWEEPING MACHINE.—Allen S. Jimmerson, Greenpoint, N. Y.

First, I claim the combination of the transverse rotating brush, D, with the two oblique rotary brushes, C, arranged and operating substantially as herein set forth for the purpose specified.

Second, The construction of the sections, F, with the brushing splints, i, clamped between the two metallic strips or plates, h, substantially as herein set forth for the purpose specified.

62,206.—DOUGH KNEADER.—H. P. Jones, Davenport, Iowa.

First, I claim the employment of a traversing rotary blade, of a hexagonal form, in connection with a box, A, having flaring sides and ends, substantially as described, and for the purposes set forth.

Second, The construction of the blade, C, with toothed gudgeons, g g, on its ends, in combination with the sliding keepers, c c, and shouldered rack plates, B B, substantially as and for the purposes described.

61,207.—STEM SETTING WATCHES.—Jules Jurgensen, Locle, Switzerland.

First, I claim, in combination with mechanism for setting the hands of the watch, the pendant bow, C, constructed and arranged so that by its movement said mechanism is thrown in or out of gear, substantially as specified.

Second, The combination of the cap or guard, E, with the pendant bow, C, and hand-setting mechanism, whereby the said cap while closed is made to prevent the bow from throwing the hand-setting mechanism in gear, essentially as specified.

Third, The combination of the spindle, D, pendant bow, C, with the eccentric pin, m, sliding rod, h, spring, i, clutch lever, k, clutch, b, contrate wheel, c, and pinion, d, in gear with the cannon pinion of the watch, substantially as shown and described.

61,208.—AUGER.—A. C. Kasson, Milwaukee, Wis.

First, I claim an auger having a twist whose front or working faces are concave, and whose rear surfaces are convex, substantially as represented in Fig. 2 of the drawings.

Second, An augur constructed substantially as herein shown and described, which permits the formation of cutting lips at any point in its length, by simply sharpening its edges.

61,209.—PUMP.—William S. Kelley, Schenectady, N. Y.

First I claim the construction of the piston, B C, with outlets, a a, and with a valve seat formed in its lower end for receiving a valve, D, which is applied on the lower end of the piston rod, substantially as described.

Second, The combination of the flanged tapering collars, F G', and packing, c, or their equivalents, with the piston, B C a, and valve, D, on the piston rod, E, substantially as and for the purpose described.

Third, The construction of the packing-expanders, F G', substantially in the manner and for the purpose described.

Fourth, The employment of a tapering flanged collar, and a split flanged collar under, over and back of the packing, in such manner that the column of fluid above the piston valve will expand the packing as the piston is raised, substantially as described.

Fifth, The pump constructed substantially as herein shown and described, so that the packing, c, is expanded laterally, by the column of water being lifted, and the valve, D, opened and closed by a direct force or pull upon the piston, substantially in the manner described.

61,210.—STEAM GENERATOR.—Martin C. Kilgore, Washington, Iowa.

First, I claim the pockets, H, constructed substantially as and for the purposes specified.

Second, The dome, K, in combination with the tubes, L and M, constructed and operating substantially as set forth.

Third, A steam boiler having sections, A and B, flanges, C and D, flue box, E, and dome, and tubes and pockets as described, constructed, combined and arranged substantially as herein specified.

61,211.—MARINE MOTOR.—W. P. Kirkland, San Francisco, Cal.

I claim the pipe, A, having stop-cocks, B B, water wheel, D, and water pipe, G, in combination with any suitable device connected with the said water wheel, for transmitting its power, when arranged together substantially in the manner and for the purpose specified.

61,212.—CURTAIN FIXTURE.—Christian F. Knauer, Pittsburgh, Pa.

I claim the combination of the guard, D, stud, m, and toothed rim, d, on the bearing of a window shade fixture, substantially as specified and for the purpose specified.

61,213.—SAFETY CHAMBER FOR OIL TANKS, ETC.—Edward H. Knight, Washington, D. C.

I claim the safety chamber operating substantially as described and so arranged as to be attached to and removed from the tank or barrel as required.

51,214.—SPIKE MACHINE.—William Koplin, New Castle, Pa.

I claim the arrangement of the moving die, g, and knife, h, with the descending pointer, K, actuated by the cam so as to cause the pointer to follow the cutting movement of the knife and precede the withdrawal of the latter for the purpose described.

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61,215.—Gate.—S. A. Kroner, Doylestown, Pa.

First, I claim the combination of the arm, J, and brace, K, with the rear end of the gate, substantially as herein shown and described and for the purpose set forth.

Second, The combination of the horizontal track bars, H and I, with the gate and with the friction pulleys or rollers, D E F G, substantially as herein shown and described and for the purpose set forth.

Third, In the arrangement of the pulleys or rollers, D E F G, in connection with the posts, B C, and track rails, H I, substantially as herein shown and described and for the purpose set forth.

61,216.—Apparatus for Extracting Honey from the Comb.—L. L. Langstroth, Oxford, Ohio, and S. Wagner Washington, D. C.

First, We claim the frame, T, with the adjustable arms, b, and the support or post, D, for supporting and operating the revolving frame, B, substantially as set forth.

Second, The frame, B, suspended by a shaft, C, from the frame, T, and arranged to hold the comb while being rotated substantially as herein described.

Third, We claim providing the comb holder or frame, B, with adjustable post, l, or their equivalents, for adjusting it to receive and hold frames or combs of various sizes.

Fourth, In combination with the stationary posts, m, and the adjustable post, l, we claim the wire gauze, B, or its equivalent, arranged to support the comb and at the same time permit the escape of the honey, substantially as described.

61,217.—Cotton-bale Tie.—R. G. Latting, New Orleans, La.

First, I claim the toothed ridge, G g, as and for the purpose described.

Second, The shoulder, h, in the bar of the loop, C, as and for the purpose described.

Third, The arched central bar, G, substantially as described and represented.

61,218.—Let-off Mechanism for Narrow-ware Looms.—J. N. Leavenworth (assignor to himself and Bela A. Mann), Hamden, Conn.

I claim the let-off mechanism constructed and arranged to operate as described, the same consisting of the weight, I, suspended by the warp, the weighted lever, E, and its shoe, f, bearing on the warp spool.

61,219.—Self Feed for Carding Engines.—R. W. Lewis, Beacon Falls, Conn.

First, I claim the doffer ring, d, arranged in combination with the main cylinder, A, so as to take therefrom the outside or waste roofing.

Second, The combination of the creeper, E, with the doffer rings, d, and the main cylinder of second breaker, substantially in the manner described so as to receive the waste roving directly from the main cylinder and transfer it to the second breaker substantially as set forth.

61,220.—Stone-cutting Machine.—James W. Maloy (assignor to the American Marble Cutting Company), Boston, Mass.

First, I claim the combination with the revolving cutting tool, D, of the toothed wheel, H, and projection, p, or their equivalents, for imparting a reciprocating motion to the said cutting tool, as set forth,

Second, The combination of the vibrating shaft, F, with the movable bearing, l, and spring, S, and for the purpose set forth.

61,221.—Cog Rail for Railroads.—Sylvester Marsh, Littleton, N. H.

First, I claim a ratchet or cog rail composed of cylindrical cogs free to revolve upon their axles or trunnions, substantially as herein shown and described.

Second, In a ratchet or cog rail, constructed as described, I claim forming the uprights which support the cogs or rollers of angle iron, substantially as herein shown and for the purposes set forth.

61,222.—Metallic Safety Seat for Railroad Cars.—Henry Martin, Chicago, Ill., assignor to himself, A. H. Towne, and A. I. Ambler.

I claim a metallic seat consisting of a tapering strip of metal which is constructed for receiving an eyelet and having its ends secured together thereby, substantially as described.

61,223.—Hot-air Furnace.—Peter Martin, Cincinnati, Ohio.

First, I claim the arrangement of the fire chamber, A, the ash pit, F, the series of descending flues, J J J, leading from the top of the fire chamber to the ash pit and the ascending flue, O, leading directly into the discharge flue, O', all as herein described and for the purposes set forth.

Second, The combination of the elbows, K L, collars, M, and flanges, N, with the fire place, A, ash pit, F, and flues, J and O, as and for the purposes explained.

Third, The combination of the supporting crank, H, lever, I, and divided grate, G G', all constructed and arranged to operate as described.

Fourth, I claim surmounting the fire chamber of a hot-air furnace with an arched and corrugated sheet-metal crown plate, B b, as herein set forth.

Fifth, In combination with the elements of the claim, I also claim the door, Q, and its accessories, when located as described and operating for the purpose set forth.

Sixth, The sliding shutter, Y Z Z', constructed and employed as and for the purposes set forth.

61,224.—Manufacture of Sugar.—Frantz O. Matthiessen, Jersey City, N. J.

First, I claim the process, substantially as herein described, of separating the products as discharged from the centrifugal machine by first running off the green syrup and afterward the cleansing liquid or liquoring into distinct vessels or reservoirs for separate treatment or use, substantially as specified.

Second, The combination with the discharge spout, D, of the centrifugal machine of a swivelling spout, E, or spouts controlled by a valve or valves, substantially as and for the purpose or purposes herein set forth.

61,225.—Priming Metallic Cartridges.—Edward Maynard, Tarrytown, N. Y. Antedated Dec. 5, 1866.

I claim a primed metallic cap for the base of a cartridge when the fulminate is secured at a single point on the inner side of said cap and the priming point or receptacle does not project externally therefrom beyond its base, all substantially in the manner and for the purpose herein set forth.

61,226.—Machine for Dressing Barrel Hoops.—Albert McAlpine, Pittston, Pa.

I claim dressing barrel hoops their entire length to a thickness by the cutter wheel, B, when arranged to operate with the guide or head block, H, pressure roller, V and feed roller, L, all constructed substantially as described.

61,227.—Dredging Machine.—James R. McClintock, and John K. Scott, New Orleans, La.

First, We claim the adjustable frame work or guide, C, for adjusting and holding in proper position the lower ends of the pipes or hose, B, and for supporting the stirrer, D, when the same is used as described for the purpose set forth.

Second, The combination of the adjustable guide, C, with the pipes or horse, B, and forcing pumps, A, as described for the purpose set forth.

Third, The combination of the forcing pumps, A, pipes or hose, B, adjustable guide, C, with the stirrer, D, or its mechanical equivalent, substantially as described for the purpose set forth.

61,228.—Harvester.—Leander J. McCormick and Lambert Erpelding, Chicago, Ill., assignor to said McCormick.

First, We claim the combination, as set forth, of the main frame, supplementary frame and hinged and pivoted finger beam, all constructed and arranged as described.

Second, The combination of the supplementary frame, the hinged finger beam, and the coupling arm with the rocking lever, when arranged for joint operation, as described.

Third, The combination of the shoe, O, locking piece, r, and crescent cam, s, with the lever, S, all arranged as described for the purposes both of locking the finger beam and lifting it horizontally.

Fourth, The combination with the main and supplementary frames of the hinged finger beam, the locking lever, the coupling bar, Q, and the rocking lever, all arranged and operating as described.

Fifth, The combination of the cross piece, N, and coupling bar, Q, with the shoe, O, constructed and arranged as described.

61,229.—Pocket Knife.—Royal B. Milliken, Springfield, Vt. Antedated Jan. 5, 1867.

I claim a knife handle in two parts, connected one to the other and to the blade, and otherwise constructed, substantially as described.

61,230.—Carriage-thill Coupling.—Simeon Mills, Madison, Wis.

First, I claim the socket, D, formed solid with the exception of the slot for the pivot, substantially as described, whether fastened to the draw bar or clip or an axle band.

Second, The combination of the solid socket, D, slide, F, and flanges, b b, on the thill iron.

61,231.—Locomotive for Plowing, Etc.—Thos. S. Minniss, Meadville, Pa.

First, I claim an endless chain or track composed of plates, B, hinged as described, with vertical flanges, E, and truck, C, in combination with the frame track, A, and wheel, D, as and for the purpose set forth.

Second, The clutch, M, operated by lever, N, in described combination with wheel, D, and endless chain or track, for the purpose specified.

Third, The platform, O, with guide wheel, H J, and cam-headed lever, I, as and for the purpose set forth.

61,232.—Sewing-machine Shuttle.—Stephen Moulton, Hartford, Conn.

First, I claim a shuttle for sewing machines in which the removable bobbin, C, and adjustable tension spring, D, are arranged in the manner shown upon a plate, A, which is pivoted to a case, B, in such a manner as to cover and protect the parts named and the thread, when in use, and also that the parts named may be readily exposed for several of the threads or adjustment of the tension spring by means of the screw, H, substantially as shown.

Second, I claim the manner of arranging the tension spring, D, so as to form a bearing for the spring, x, which holds the bobbin in place, said spring being inverted in a hole drilled directly through one end of the bobbin support, A.

61,233.—Glassware.—Jeremiah Myers, Dorchester, Mass.

I claim the arrangement and combination of the eccentric segment gears, n and r, with the platen or plunger, c, connecting rods, l, and levers, s, the whole being connected to operate together substantially as set forth

61,234.—Apparatus for the Use of Smokers.—Myer Myers, Maurice Myers and Wm. Hill, Birmingham, Eng.

We claim the sliding cutting edges defined as d and g, and the connecting of the same with a stiletto and means for expanding and holding the parts in position, substantially in the manner and for the purpose set forth.

61,235.—Carriage-thill Coupling.—Peter Myers, Newton, Ill.

I claim the construction and arrangement of the coupling iron, J, spring, E, follower, F, thill iron, G, safety button or spring, C, grooves, P P, all for the purposes as above set forth.

61,236.—Skirt Elevator.—A. F. Nathan, New Haven, Conn.

I claim the arrangement of the slide, A, upon the loop, B, in the manner described, in combination with the tape, C, substantially as herein set forth.

61,237.—Dynamometer.—Chas. Neer, Brooklyn, N. Y.

First, I claim the peripheral power scale, e, in combination with the chain, l, and a steelyard or other measure of actual force, the parts being constructed and combined substantially as and for the purposes set forth.

Second, I claim constructing the steelyard carrier, f, in two parts so as to apply the dynamometer to a shaft without removing it from its bearings, substantially as set forth.

Third, I claim the ring, 2, and columns, 1, in combination with the peripheral power scale, e, for connecting the same to the coupling, c, as set forth.

Fourth, I claim the power indicator, n, and fork, 6, combined with steelyard head, h, for the purposes and as set forth.

Fifth, I claim the dial, q, applied to indicate the proportion of speed, in combination with the indicator, n, so as to determine the actual power consumed, substantially as set forth.

Sixth, I claim the friction tester consisting of the cylinder, r, the boxes, s t, in combination with the dynamometer, substantially as and for the purposes set forth.

61,238.—Brick Machine.—Anthony Nulsen, E. Haueisen and Albert Wagner (assignors to A. Nulsen), Cincinnati, Ohio.

First, We claim the hopper, B, traveling bottom, E, rollers, C D and F, throat, H, and shaver or knife, G, for the purpose set forth.

Second, The compressing rollers, N N', when combined with the trunk composed of the two endless aprons, Q Q, rollers, R R', and back boards, S S'.

Third, The combination of trunk, Q Q R R' S S', and conducting and separating throat, T U u.

Fourth, The described combination of separating throat, T U u, reciprocating knife, 9, and removable molds, 3.

Fifth, The endless carrier, Y Y' Z z 1, when combined with the reciprocating hooks or claws, 5, substantially as described.

61,239.—Cotton Gin and Picker.—Enoch Osgood, Boston, Mass.

First, I claim the elastic roller, B, made of rubber and cloth, the latter running edgewise from the center or core to or towards the outer circumference with the flanged metallic rings between the several compound rings as described, the same constructed and operating in the manner as shown and described and for the purpose set forth.

Second, The elastic roller, B, made of rubber and cloth wound around its shaft or core spirally, with strips in the manner described and for the purpose set forth.

Third, I claim the combination of elastic roller, B, with the concave bar, C.

Fourth, The combination of elastic rollers, B B, with the double concave or angular bar, L, and clearer, M, as described.

Fifth, The combination of elastic roller, B, corrugated clearers, D D, and concave bar, C, as described.

Sixth, The combination of elastic roller, B, revolving clearer, E, and concave, C, as described.

Seventh, The combination of picking cylinder, P', cylinders, u v and w, belts, L L', rack, k, elastic roller, B, and revolving clearer, E, constructed, arranged and operating in the manner substantially as described and for the purpose set forth.

Eighth, In combination with the clearers, D D, I claim the pitman, c, constructed and operating in the manner shown and described and for the purpose set forth.

Ninth, The combination of the elastic roller, B, with the revolving doffer, Z, constructed, arranged and operating in the manner substantially as shown and described and for the purpose set forth.

61,240.—Combined Tongs, Lid Lifter, Hook, Etc., Etc.—B. Owen and B. Pickering, Dayton, Ohio.

We claim the above described lid lifter as a new article of manufacture, the same being constructed and used substantially in the manner and for the purposes set forth.

61,241.—Reed and Pipe Musical Instruments.—Isaac T. Packard, Chicago, Ill.

I claim as my invention the use of an elastic band, or its equivalent, for the purpose herein described and set forth.

61,242.—Bed Bottom.—H. H. Palmer, Rockford, Ill.

I claim a spring bed bottom composed of a series of parallel wooden slats, D, connected near their ends by strips, b, of leather or other suitable flexible material, with wire springs, C, attached to the head and foot pieces, a a, of the frame, A, and connected to the strips, b, centrally between the slats, D, substantially as set forth.

61,243.—Railroad Frog.—Sidney Parker, Chicago, Ill.

I claim a railroad frog consisting of the bed plate, B, plate, A, and the steel rails, x y and z, combined and constructed as herein shown and described.

61,244.—Machine for Preparing the Fiber of Plants.—Edward Juanes y Patrullo, New York City.

I claim the combination of the apron, C, with the sliding frame, D, operated by the lever, E, and arranged substantially as and for the purposes herein described.

61,245.—Knife Clearer.—R. R. Pattison, Chicago, Ill.

I claim, First, The bed or cushion, J, or its equivalent, upon which the knives, etc., are laid to be acted upon by the scourer, in combination with the cleaning material box or reservoir, L, when the two are combined substantially as and for the purpose specified.

Second, The holder, M, for the handles of the knives or forks, etc., made in a box form and provided with a cover, plate, or board, Q, so hung thereto as to accommodate itself to handles of varying thicknesses, substantially as described.

61,246.—Carriage Brace.—Jas. B. Pelton (assignor to D. H. Wood), Sandusky, N. Y.

I claim the combination and arrangement of the braces, G, with the ordinary elliptic springs, C, and the body, A, in the manner shown and described, that is to say, the braces forming simple bars attaching to the body and connecting with the upper half of the elliptic springs, so that while both the body and spring are united and braced against rocking and swaying, the springs are unincumbered and allowed their natural free and unimpeded elastic action, and the bars hidden from sight, as herein set forth.

61,247.—Lighting Gas by Electricity.—Geo. G. Percival, Brooklyn, N. Y.

I claim the attachment to a gas burner of any kind, or to the fixtures thereof, of a secondary pile, which may be charged, as it were, with voltaic electricity, by being properly connected with any suitable source of electricity, and which will retain the charge until given off from time to time, as may be required for the purpose of lighting the gas, the whole substantially as herein described.

61,248.—Carpenter's Gage.—Russell Phillips, Gardiner, Me.

I claim the combination of the stock having the grooves and rails and the two slides on its opposite sides, the slides having the recesses, the lips, the projections and thumb screws, as and for the purposes herein set forth.

61,249.—Scissors Sharpener.—D'Arcy Porter, Cleveland, Ohio, assignor to G. S. Newcomb & Co.

I claim the adjustable knife, C, arm, B, and stand, A, in combination with the gage, D, points, a, and screw, E, arranged in the manner and for the purpose set forth.

61,250.—Machine for Scouring Leather.—Ira W. Pray and Edward Fitzhenry, Portland, Oregon.

We claim, First, A mechanism by which dually arranged sets of rubbers or scrapers, L, in a machine for finishing leather, may be alternately brought into action, by the reciprocating motion of a crank, substantially in the manner set forth.

Second, In combination with the crank, N', and pitman, N, we claim the frame, A, pivoted substantially in the manner and for the purposes set forth.

Third, In combination with the hinged arms, H, with or without the arms, I, with the springs, K, the parts being constructed and arranged for use substantially as set forth.

Fourth, The springs, K, pivoted cross-pieces, K', and lens, O, with the hinged arms, H and I, substantially as and for the purpose set forth.

Fifth, In combination with the table, G, we claim the roller, E, adjustably suspended by the rods, E', and cross bar, P, substantially as and for the purpose set forth.

61,251.—Lemon Squeezer.—Thomas Reece and Arthur Clarke, Philadelphia, Pa.

We claim the combination of the two handles, C and D, hinged together as shown with the two cups, A and B, one provided with a slotted recess, and the other with a flange, d, the several parts being constructed and used as and for the purpose herein set forth.

61,252.—Mill Pick.—H. N. Relyea, Warsaw, N. Y., assignor to himself and Mills L. Rice.

I claim the diamond-shaped truncated head, A, formed of malleable metal, and provided with sockets, a a, and transverse holes, b b, in combination with the hardened blades, B B, and key, c, constructed and arranged substantially as and for the purposes set forth.

61,253.—Frame for Artificial Slates.—Wm. Jones Rhees, Washington, D. C.

First, I claim the combination of a hollow in a slate frame, to be used as a receptacle for pencils, sharpeners, and other utensils, with a suitable covering, constituting a ruler and gage, substantially as described.

Second, Marking upon said ruler, so arranged, measures of length, substantially as shown and described.

Third, Marking upon the frame of a slate measures of length, substantially as described.

61,254.—Frame for Slates.—Wm. J. Rhees, Washington D. C.

First, I claim making the frame to a slate of a box, or boxes, as and for the purpose substantially as described.

Second, Using the box frame of a slate as a receptacle for pencils, rulers, sponge, or any other utensils or articles, substantially as described.

Third, Dividing the box frame of a slate into compartments, as and for the purposes described.

Fourth, Making letters, drawings, and measures of length on the box frame of a slate, either outside or inside.

61,255.—Apparatus for Inserting Corks.—Wm. Rheiner and L. H. Wolf, Detroit, Mich.

First, We claim the combination and arrangement of the base, B, cone, A, standard, a, holder, C, lever, D, and plunger, b b', in the manner and for the purpose described.

Second, Hinging the top, F, to the part, E, and fitting the plunger to said hinged part, F, all in the manner shown and described.

61,256.—Dish Washing Machine.—Gilbert Richards, Cummington, Mass.

I claim the combination and arrangement of the wire screen, G, extending longitudinally of the cylindrical vessel, A, from one end to the other thereof, the horizontal winged shaft, E, and gear wheels, C and D, with each other, and with the cylindrical vessel, A, as herein described and for the purpose specified.

61,257.—Fruit Picker.—George S. Richardson, Stow, Ohio.

I claim the guards, B, of unequal lengths, and single curved fingers, B, connected with the hoops or bands, A, in combination with the socket rings, F, bag, D, and staff or handle arranged in relation to each other as and for the purpose specified.

61,258.—Harrow.—John W. Richardson, Sligo, Ohio.

First, I claim the provision in a harrow of the cimeter shaped blades, J, adapted to revolve on their shanks or axes, boxed within the frame when employed with chambered metallic boxes, H, constructed as represented in figure 2, for the purpose explained.

Second, The arrangement in a mounted or wheel supported harrow, of one or more shafts, K K', journaled transversely of the frame, and armed with teeth or blades, L, in combination with the notched rod, Q, projection, Q, lever, N, and treadle R, as and for the purpose set forth.

Third, In combination with the elements of the clause immediately preceding, I claim the handle, S, on the rear part of the rod, O, for the several objects stated.

61,259.—Potato Digger.—S. Richardson, Jericho, and J. S. Adams, Burlington, Vt.

We claim the combination of the digger, B, cylinder gage wheels, D D', and supporting wheels, E E', arranged and operating substantially as described.

61,260.—Whiffletree Attachment to Plows.—J. B. Ripsom, Kendall, N. Y.

I claim the application of the wheel, A, projecting beyond the end of the whiffletrees, as shown in figure 1.

I also claim the brace, B, and pivot, a, for the purpose of securing the wheel to the whiffletree substantially as herein described.

In combination with the wheel, A, I also claim the long staple, C, for the purpose herein set forth.

I also claim the special arrangement and combination of the whole thing as here n set forth.

61,261.—Covering Wire with Fine Wire.—William H. Rodgers, Brooklyn, E. D., N. Y.

I claim the hollow fixed head, l, separate from the hollow axis, b, in combination with the revolving head carrying the spools or bobbins of fine wire, and revolved around the axis, b, as and for the purposes set forth.

I also claim the grooved roller, g, in combination with the revolving head and spools around which rollers, g, the fine covering wire is wound to give the required tension from the friction as set forth.

61,262.—Amalgamator.—D. E. Rose, Cincinnati, Ohio.

First, I claim the combination of the spring bearing, H, and inclined sectional shaft, B, provided with spiral flange, revolving in the case, X, which enter the kettle, E, near the bottom, substantially as described.

Second, I claim combination of the inclined casing, X, provided at its lower end with stationary grinding flange, D, and the shaft, B, provided with a grinding disc, C, introduced through the side of the kettle, and operating near its bottom, substantially as described.

Third, In combination with the kettle, arranged as described, I claim the revolving paddle, G, as described and represented.

61,263.—Draining Machine.—A. P. Routt, Liberty Mills, Va.

I claim the adjustable flaring wings, G G, applied to the double mold board, D, in the manner described, and operating to clear away the dirt from the edges of the ditch as and for the purpose set forth.

61,264.—Planing Machine.—Gilbert J. Rugg, Worcester, Mass.

I claim the combination of the lever, F, with roll, D, cross-piece, G, and rods, b and c, when constructed and operating substantially as shown and set forth.

61,265.—Legging.—William G. Rule, New York City.

I claim the combination of the elastic metal frame, substantially as described, with the covering of the same, whether made of leather or other material, for the purpose of making spatter dashes as set forth.

61,266.—Steam Governor.—Robert Sanderson, Cleveland, Ohio.

I claim the auxiliary lever, O, yoke, N, and pivot joint, b', extending through the lever, M, in combination with the lever, J, pawls, K K', lifting toes, H, bail, P, and yoke, L, as and for the purpose set forth.

61,267.—Manufacture of Paper and Treatment of Paper Pulp.—A. T Schmidt, Pittsburg, Pa.

I claim the process hereinbefore described of treating paper, paper pulp, and textile fabrics of vegetable fiber, with a mixture of glycerin, oil of vitriol and water, and subsequently with an alkaline bath, or the equivalent of such process, substantially as and for the purposes hereinbefore described.

61,268.—Churn.—Thomas D. Shaw, Westfield, Ohio.

I claim the dashers, I and J, provided with tubes, L M, in combination with the sleeve, N, shaft, K, and operating conjointly by the gearings, O P and G, as and for the purpose set forth.

61,269.—Automatic Fly Brush and Fan.—Charles C. Short, Osgood, Ind.

I claim the combination and arrangement of the shaft, H, automatically actuated by clock work, and the cross head, H', screw head, I, and the extension arms, K K', attached adjustably to the cross head by hooks, K", substantially as and for the purpose set forth.

61,270.—Sewing Machine.—Isaac Merritt Singer, Yonkers, N. Y.

First, I claim the combination of a round needle bar, and a round presser foot stem, by means of sliding bracket, substantially as set forth.

Second, The combination of a reciprocating spring shuttle holder, with a shuttle guide in such manner that the former, while moving with the shuttle, is caused during a part of its movement to press strongly against the shuttle, by the action of the shuttle guide, substantially as set forth.

Third, The combination of a shuttle constructed to oscillate in a sewing machine, with a projecting thread guide for the delivery of thread, substantially as set forth.

Fourth, The construction in a sewing machine of the lateral support for the oscillating shuttle, with a central opening, substantially as set forth.

Fifth, The shuttle constructed with an ear, projecting at its butt, beyond the bobbin socket, substantially as set forth.

Sixth, The combination of the shuttle with a spring ring so arranged as to hold the bobbin in its socket in the shuttle, substantially as set forth.

Seventh, The combination of the shuttle with a spring ring provided with a branch to make pressure upon the bobbin, substantially as set forth.

Eighth, The combination of the shuttle, with a lining in the bottom of its bobbin socket, substantially as set forth.

Ninth, The combination of the shuttle with a hoop lining in its bobbin socket, substantially as set forth.

Tenth, The combination of several sections of a sectional thread tension, with one movable stock, substantially as set forth.

Eleventh, The combination of the arm of the thread take up with its stock by means of an adjustable connection, substantially as set forth.

Twelfth, The combination of the regulating lever of a reversible feed mechanism, with a stop carried by said lever, substantially as set forth.

Thirteenth, The combination of the turning regulating plate and feeding instrument of a sewing machine, by means of a bent reciprocating bar, substantially as set forth.

61,271.—Composition Fuel.—Henry Slatter, Covington, Ky.

I claim as new, and of my invention, the composition fuel composed and compounded as set forth.

61,272.—Grain Binder.—Andrew J. Smith, New York City.

First, I claim the lever, F, provided with the notched forks, E, when arranged and used as and for the purpose herein set forth.

Second, The sliding gear block, K, constructed arranged and operating substantially as and for the purpose herein specified.

61,273.—Corn Planter.—Ellis F. Smith, Orangeville, Ill.

I claim the traction wheel, A', provided with the markers, c c c, in combination with the gear wheels, C and D, so constructed that a hill will be planted, when the marker is on the ground for the purposes and substantially as described.

61,274.—Amalgamator.—Syramus Standish, Pacha, Cal.

First, I claim the spiral shaped flanges or lips, M, of the rotating muller-arms, L, substantially as and for the purposes specified.

Second, The shoes, M2, hung to the muller arms, L, so as to be susceptible of a lateral play upon such arms, substantially as and for the purpose described.

Third, The shoes, M2, having spiral shaped flanges or lips, O, upon their outer ends as and for the purpose specified.

61,275.—Mode of Utilizing Tobacco Dust.—A. F. Stayman, Baltimore, Md.

First, I claim the utilizing of tobacco dust, substantially as herein described.

Second, The process herein described of preparing tobacco dust for use.

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Third, I claim a material for smoking composed of tobacco dust, prepared in any of the methods herein described, or in any equivalent manner.

Fourth, I claim a granulated smoking tobacco composed of tobacco dust, treated, substantially as herein set forth.

Fifth, I claim as a new article of manufacture, the smoking tobacco, composed principally of tobacco dust, and prepared substantially as herein described, whether the same be used in a granular or solid form.

61,276.—WATCH CASE.—O. F. Stedman, Ravenna, Ohio.

I claim the spring, L, as arranged in combination with the watch case in the manner and for the purpose as herein set forth.

61,277.—MACHINE FOR FILING SAWS.—Eli Stubbs, West Elkton, Ohio.

I claim the adjustable clamp, A, in combination with the hinged adjustable guides, B B, constructed and arranged as described, as a new article of manufacture applied and used in the manner specified.

61,278.—STEAM GENERATOR.—James H. Sturdy, Attleton, Mass.

I claim a boiler constructed with helical ascending and descending grooves or flues arranged to extend around it and made to communicate at or near their upper extremities, substantially as set forth.

I also claim the cap, B, as made with the central passage, g, and one or more chambers, e f, the same being arranged in it, substantially in the manner and for the purpose as specified.

I also claim the combination of the cap, B, or its equivalent, with the boiler formed with two or any other greater number of helical flues, arranged in it, substantially as described.

61,279.—BOAT-DETACHING TACKLE.—James R. Taylor, New York City.

I claim combining with the central windlass or shaft, C, and the hooks or bolts, i i, at the ends of the boat, the rods, levers, and links, b, b' d d', ff' and g g' for connecting and detaching boats, substantially as herein described and represented.

61,280.—BOAT DETACHING TACKLE.—James R. Taylor, New York City.

I claim in a boat connecting and detaching apparatus the combination of the slotted ring bolt key, and friction rollers arranged to operate together, substantially as herein described, and for the purpose set forth.

61,281.—BOAT-DETACHING TACKLE.—James R. Taylor, New York City.

I claim in connection with the hook in the davit block, and the ring in the boat, the lever, A, with its foot piece, e, the whole constructed, arranged and operating in connection therewith, substantially as described.

61,282.—ELASTIC TIPS FOR LEGS OF FURNITURE.—E. S. Torrey, New York City.

I claim the combination of soft elastic tips and divided sockets, substantially as herein set forth for connecting said elastic tips with furniture as above described.

61,283.—TOBACCO PIPE.—James W. Truman, Macon, Ga.

I claim the combination of the flanged tube, b, and rubber packing, A, with the pipe stem, B, substantially as and for the purpose herein shown and described.

61,284.—APPARATUS FOR LIGHTING LAMPS, GAS BURNERS, ETC.—Philos B. Tyler, and Wm. M. Chandler, Springfield, Mass., and L. F. Standish, Chicopee, Mass., assignors to Repeating Light Company, Springfield, Mass.

We claim the tube and its appendages for holding and controlling a continuous or repeating match, substantially as herein described, in combination with the wick tube or equivalent gas burner, and an igniter, substantially as described, and for the purpose specified.

61,285.—COOKING STOVE.—Samuel S. Ulter, New York City.

I claim the air channels, g g, arranged within the smoke channel, l l, and employed in connection with the main chamber, c, and additional air chamber, d, as and for the purpose specified.

61,286.—QUARTZ CRUSHER.—I. Varney and A. Rix, San Francisco, Cal.

I claim iron binder, K, the toggle bar, M, and jaws, B and E, constructed and arranged substantially in the manner and for the purposes set forth.

61,287.—BOOTS AND SHOES.—George Wagner, Washington, D. C.

I claim the combination of the piece a b c, and the piece leaving the opening on the side covered by flap, D, in the manner described for the purpose specified.

61,288.—PAINT BURNER.—W. W. Wakeman, Jr., New York City and R. Ross, Brooklyn, N. Y.

First, We claim the within described apparatus adapted for projecting flame obliquely in a central stream upon painted surfaces, and allowing of being moved and tilted, substantially as and for the purpose herein set forth.

Second, The cover, K, k, in combination with the disk, formed and provided as above represented, and adapted to receive sufficient quantity of air at the sides and to expose only a small area of the upper surface of the vessel, through which the jet of flame may issue, substantially as and for the purpose herein specified.

61,289.—EYE GLASSES.—Edwin Want, New Haven, Conn.

First, I claim attaching the handle, D, and the arm, E, each to their respective bows, and the spring, E, to the two bows in position relatively to the said handle and arm, so that when closed the two points at which the spring is attached and the two glasses correspond in position, the one with the other, in the manner herein described.

Second, Attaching the spring to the bows, by means of the square shoulder described and the nut, t, substantially as and for the purpose specified.

Third, The handle, D, and catch p n, d, when formed in one and the same piece, as and for the purpose specified.

61,290.—VEGETABLE CUTTER.—William Weaver, Phœnixville, Pa.

I claim the cylindrical revolving hopper, B, its spiral vanes, m, the plate, A, and rounded knifes, n n, in combination with the annular rack, d, and pinion, e, the whole being arranged and operating as set forth.

61,291.—STILL FOR PETROLEUM.—William C. Wells, Parkersburg, W. Va.

First, The frame work, B, for the bottom of the still and to receive the fire sheets or plate, substantially as described, and for the purpose specified

Second, In combination with the bottom frame work, B, of the still, the return flues, G, of the furnace, corresponding with the fire sheets, C, substantially as and for the purpose described.

61,292.—PAINT AND VARNISH BRUSH.—George A. White, Boston, Mass.

I claim combining with the ferrule, a, the fender wires, c, and binder end, d, substantially as described, also in combination with such binder and the paper cylinder, e, or its equivalent, substantially as forth.

61,293.—CARRIAGE HUB.—James M. Whitney, Providence, R. I.

I claim, First, A carriage hub, made with its central part for receiving the spokes and elastic cylinders of bronze combined with the conical sleeves of iron, forming in two pieces the axle box and nut for comprising the elastic cylinders, and the external covering these, and forming the two ends of the hub.

Second, I claim the conical shaped elastic cylinders or packing.

Third, I claim the ventilated air space, between the axle box and the packing.

Fourth, I claim the tips and slats for preventing the turning of the sleeve in screwing and unscrewing with the holes giving access to the external air, all made and operating substantially as described or their mechanical equivalents.

61,294.—CULTIVATOR.—Silas M. Whitney, Galesburg, Ill.

I claim, First, The screwing of the standard, D, to the beam, A, through the medium of the sockets, B, and screw bolts, C, provided with eyes, a, all constructed and arranged substantially in the manner as and for the purpose set forth.

Second, The braces, E, applied to the beam and standards, suqstantially in the manner and for the purpose specified.

Third, The caster or gage wheel, H, applied substantially in the manner and for the purpose set forth.

61,295.—COAL SCUTTLE.—D. Wight, New London, Conn.

I claim a coal hod or scuttle provided with a discharge opening or spout at or near its lower or bottom plate, for the removal of the coal therefrom, substantially as described.

61,296.—CAR COUPLER.—J. T. Wilson, East Liberty, and T. J. Louis, Port Rug, Pa.

We claim, in combination with the draw bolt, d, and the flanged or beveled face plate, b, the coupling lever, e, when hung from the upper bar of the coupling frame, so as to leave a free space for the reception of an extra link, o, and allow the connecting link, c, to slide back into the coupling frame when necessary, the parts being constructed and arranged substantially as and for the purpose above described.

61,297.—ALARM FOR MONEY DRAWER.—James F. Winchell, Springfield, Ohio, assignor to himself, George C. Steele, and S. A. Simms.

First, I claim the combination of the drawer, B, lever, D, and sliding block, F, and spring, n, with the bell, G, all arranged and operating substantially as described.

Second, In combination with the above-named parts, I claim the treadle, E, for the purpose of enabling the drawer to be closed without sounding the alarm, as set forth.

Third, I claim the locking device, consisting of the knob, C, and opening, b, arranged to operate as set forth.

61,298.—BRICK MACHINE.—Robert Wolff (assignor to himself and John H. Thielding), New York City.

First, I claim in connection with the mud box, a, and grinding shaft, B b, the molding pocket, D, sliding cover, k, throat slide, h, plunger, E, levers, G I, and cams, P R S, all constructed, arranged, and operating substantially as and for the purpose herein described.

Second, I claim a duplication of the above in connection with a single mud box, a, and grinding device, B b b, substantially in the manner and for the purpose hereinbefore described.

61,299.—WATER WHEEL.—Albert A. Wood, Manlius, N. Y.

I claim the adjustable chuteboard or lip, b, extending down between the guide curves and parallel therewith, to conduct the water in an unbroken stream, and always in the same direction, upon the wheel, substantially as and for the purpose set forth.

61,300.—FASTENING FOR SHIRT COLLARS.—Alonzo Wood, East Henrietta, N. Y.

First, I claim the combination of the spring clamping device a b, with the stud, l, operating as described and for the purpose set forth.

Second, In combination with the spring clamping device, a b, and the holding stud, l, I also claim the stud or catch, n, as and for the purpose specified.

61,301.—COAL HOD.—A. A. Yeatman and J. M. Mason, Washington, D. C.

First, I claim placing a sieve, B, of suitable construction with the mouth of a coal bucket, so that the lump of coal may be passed over said sieve, and the dust thereof fall through it, as herein specified.

Second, The combination of the bucket, A, with chamber, C, forming shoulder, x, at its top, and sieve, B, when constructed and used substantially as herein specified.

61,302.—HORSE HAY FORK.—Edmund Yeiser and J. S. Sheetz, Sheridan, Pa. Antedated Jan. 5, 1867.

First, I claim the metallic body, A, provided with a sliding bar, B, lever, E, catch, F, and boot, D, arranged and operating substantially as herein specified.

Second, The spears, a and a', connected as described, spear a' being slightly longer than spear a, spear a shutting within a shoulder on the end of spear a', to form a perfect joint, the whole arranged and operating as and for the purposes set forth.

61,303.—MOLDING FLASKS.—James Ycump, Philadelphia, Pa. Antedated Jan. 5, 1867.

I claim the detachable bars, C, with their arms or enlargements, g, in combination with a molding flask, the whole being constructed and operating substantially as and for the purpose described.

RE-ISSUES.

2,451.—LOOM.—George Crompton, Worcester, Mass., assignor of James Greenhalgh. Patented Nov. 2, 1852. Extended 9 years.

First, I claim a series of long upright levers, one for each leaf of heddles, and each connected at each end substantially as described in combination with a series of vibrating attachments capable of motion in at least two directions as specified, the combination being as described, whereby power may be applied either to lift or depress leaves of heddles in the manner specified.

Second, I claim a series of long upright levers, one for each leaf of heddles, and each connected to a leaf of heddles substantially as specified in combination with a series of vibrating attachments capable of motion in at least two directions as described, and a pattern cylinder or chain which determines the position of said attachments, and consequently the direction in which each lever shall be reciprocated prior to the movement thereof, the combination being substantially such as hereinbefore described.

Third, I claim the series of upright levers and of vibrating attachments, and the pattern chain or cylinder, all in combinat on as specified in the second claim in combination with reciprocating mechanism, which, through the intervention of the vibrating attachments, and the series of upright levers, and the connections, shifts the sheds by acting on the leaves of heddles, the combination being such as herein set forth.

Fourth, In combination with leaves of heddles, and a series of upright levers, having characteristics as described, I claim an adjustable connection between said levers and leaves of heddles, whereby the range of perpendicular motion of the heddles may be changed without altering range of horizontal motion of the levers, or the range of motion of the reciprocating mechanism, the combination being and acting as described.

Fifth, In combination with a series of upright levers having characteristics as specified and operating to elevate and depress leaves of heddles, I claim eveners or adjusters operating substantially in the manner and for the purpose described, and also in combination with said series of levers, eveners and vibrating attachments, reciprocating mechanism to move the levers which are returned to their mean position by the eveners, these three combinations each being and operating as specified.

Sixth, In combination with a series of upright levers, having characteristics as specified, a pattern chain or cylinder, and a series of vibrating attachments, I claim toes through which the chain or cylinder acts upon the vibrating attachments, this combination being and acting substantially as described.

Seventh, I claim the arrangement substantially as described of leaves of heddles side of the loom frame series of the upright levers and pattern cylinder or chain substantially as described, the gist of the arrangement being that the leaves of heddles are within the frame, the upright levers close to but outside of the frame, and the pattern chain outside of the levers, whereby the advantages herein described are attained.

Eighth, I claim arranging the vibrating attachments and their pivots above the axis, upon which the upright levers oscillate with the pattern chain below the vibrating attachment substantially in the manner and for the purpose specified.

Ninth, I claim a series of upright levers, having characteristics as specified in combination with leaves of heddles, and a pattern cylinder or chain as described; and I also claim these elements of a machine in combination with reciprocating mechanism, the combination being substantially such as herein specified.

Tenth, I claim in combination with a series of upright levers, and heddle leaves, and cords connecting them, an adjustable mechanism as described, whereby the tension of the cords may be varied as set forth.

Eleventh, I claim in combination reciprocating mechanism and vibrating mechanism, when the two gear together in manner described, whereby the vibrating attachments are prevented from moving faster than the reciprocating mechanism as set forth; and also these mechanisms thus constructed, to gear together in combination with a pattern chain substantially as described.

Twelfth, I claim in combination with vibrating pieces so constructed as to embrace reciprocating mechanism, a reciprocating mechanism, a pattern chain or cylinder, and a series of long upright levers, having characteristics as set forth, all substantially such as described, and acting in combination as set forth.

Thirteenth, I claim constructing long upright levers, having characteristics as described, with a bend therein as specified, so that their weight is outside of the axis upon which they oscillate, thereby attaining the results desired and described.

2,452.—HARVESTER.—Andrew J. Holman, Philadelphia, Pa., assignee of J. S. Butterfield. Patented March 2, 1858.

I claim the driver's seat, D, supported as described, lever, G, and wheel, H, in combination with the main frame and cutting apparatus, substantially as described.

Second, I claim the reversible arm, Q, constructed as and for the purposes set forth.

2,453.—HARVESTER.—Andrew J. Holman, Philadelphia, Pa., assignee of J. S. Butterfield. Patented March 2, 1858.

First, I claim, in combination with a reel supported on a single post, an adjustable mechanism by which the reel may be raised up or let down upon the post, substantially as described.

Second, I claim supporting a reel on a single pivoted post, so arranged that it may be leaned more toward or from the standing grain or grass in combination with an adjusting mechanism by which the reel can be raised up or let down upon the post, substantially as and for the purpose set forth.

2,454.—HARVESTER.—Andrew J. Holman, Philadelphia, Pa., assignee by mesne assignment of McClintock Young, Jr. Patented July 9, 1861.

First, I claim driving an automatic rake on a two-wheel hinged bar machine by mechanism located outside of the wheels instead of between the wheels.

Second, Locating the vertical axle of an automatic revolving rake upon the platform of a harvester at or near its inner front corner.

Third, Driving an automatic rake located on the platform of a two-wheel hinged bar machine by means of a jointed tumbling shaft driven from the end of the main axle.

Fourth, The combination of a hinged platform with an automatic rake located at or near its inner front corner.

Fifth, I claim in a floating finger bar machine the combination of a revolving rake and reel supported wholly upon the platform at or near its inner front corner in a removable frame so that said machine can be readily converted from a mower to an automatic reaper and vice versa.

Sixth, I claim in a hinged finger bar machine rigidly connecting the rake frame to the platform on which it is supported in such manner that the rake shaft does not change its relative position to the platform in passing over uneven ground.

Seventh, Attaching the revolving rake and reel arms directly to the upper side of the crown or bevel wheel by which they are driven.

Eighth, Locating the crown or bevel wheel to which the arms of the revolving rake or reel are attached below the top of the driving wheel.

Ninth, Combining a segmental cam or guide with a series of rake and reel arms so attached together in pairs diametrically that while one rake is moving in contact with the grain its opposite arm shall be thrown up to any desired extent to clear the driving wheel and main frame.

Tenth, Arranging the shaft which drives the revolving rake and reel located on the platform of a floating finger-cutting apparatus in such a manner that the said shaft shall vibrate around the main shaft at a center when the cutting apparatus is raised and lowered.

Eleventh, The construction and adaptation of a combined rake and reel which revolves entirely around a vertical center so that the revolving rake and reel arms may be attached to the driving hub or wheel inside of the plane of the main driving gear wheel and below the highest point of said wheel.

Twelfth, The combination of a revolving rake and reel and a hinged bar machine when the arms of said revolving rake and reel are attached together to the head at such an angle as in their revolution to be thrown up so as to leave an unobstructed space on the machine.

Thirteenth, Attaching the frame or support of the continually-revolving rake to the removable platform so that the entire rake apparatus can be removed with the platform for converting the machine from a reaper to a mower.

Fourteenth, Driving the continuously-revolving rake arms by the upper surface of a crown wheel in combination with supporting that crown wheel on top of a vertical standard and attaching to the same vertical standard a horizontal stud on which the driving pinion revolves.

Fifteenth, A rake rotating upon an axis which is perpendicular to the top surface of the platform and having its arms successively elevated, substantially as and for the purpose described.

Sixteenth, A standard or support which sustains the sweep rake above the draft frame or driving wheel rail standard being mounted wholly upon the platform of the hinged machine and below the top of the driving wheel.

Seventeenth, Making a finger bar in two sections, one long one and one short, the short sections being connected to the platform and removable with it, so that as the platform is attached to adopt the machine for harvesting grain or removed to adapt it to the cutting of grass, the finger bar shall be correspondingly lengthened and shortened as has been found advantageous in harvesting the different materials, substantially as described.

2,455.—GAS APPARATUS.—E. A. Pond and M. S. Richardson, Rutland, Vt. Patented March 27, 1866.

First, We claim the use of hydrocarbureted air for head lights of locomotives substantially as herein described.

Second, The application to locomotive engines of an air pump, operated from an independent steam cylinder deriving its steam from the locomotive boiler, said air pump being connected with a suitable apparatus for carbureting atmospheric air, and with burners in the head lantern and the cars, substantially as set forth.

Third, The construction of the air pipe with branches and stop cocks, so as to supply the vaporizer with hot or cold air, at pleasure, substantially as set forth.

Fourth, Generating illuminating gas by means of an apparatus consisting of the combination with a vaporizer of an air pump driven by a gas engine which receives its supply of gas from the generator, substantially as herein described.

2,456.—RAKE FOR HARVESTERS.—Lewis C. Ruse, Phillipsburg, N. J., assignee of Thomos S. Whitenack. Patented Feb. 5, 1861.

First, I claim constructing and arranging the raking and reeling apparatus in such a manner that the rake may act as a reeling apparatus, and at the will of the operator the raking teeth may be kept above the platform so as not to sweep the grain from the platform.

Second, A combination of a revolving rake on an axis, vertical or nearly so, and an unobstructed space for the driver to sit on the machine.

Third, The combination of a continuously revolving rake, whose arm is pivoted to an axis, vertical or nearly so, and an unobstructed space for the driver to sit on the main frame.

Fourth, The employment or use of the slides, G, when applied to the arms, F, substantially as shown for the adjustment of the same as set forth.

Fifth, The rollers I I', I'', when applied to the main frame, A, and used in connection with the arms, E, to operate as and for the purpose set forth.

Sixth, Attaching the beaters, I, and rake, R, to the arms, E, by means of the sockets, J, constructed and arranged as shown to admit of the adjustment of the beaters and rake, specifically as set forth.

Seventh, In combination with the arms, F, the lever, A, attached to the main frame, A, and provided with the curved bar, l, placed in such relation with the arms to operate as and for the purpose set forth.

2,457.—HARVESTER RAKE.—Samuel S. Sherman and Jeremiah G. Sherman, McHenry, Ill. Patented March 6, 1866.

First, We claim providing the arm, C D, which attaches the rake to the reel, with an elbow or joint which allows the rake at the proper time to drop down from the reel upon the platform, substantially as and for the purpose herein specified.

Second, In combination with the rake we claim an arm with one end attached to the rake, and the other end attached to a reel arm or its equivalent, directly behind the rake and operating upon the rake so as to cause it to sweep the platform in an arc of a circle, while one end of the rake is held stationary or nearly so, substantially as and for the purpose described.

Third, We claim the employment of the rod, J, and cam, K, in combination with the reel and arm, C D, for the purpose of raising the rake up from the platform when desired and arranging it upon the reel as and for the purposes specified.

Fourth, We claim in combination with said reel jointed arm and rake, an automatic catch operating in connection therewith so as to secure the rake to the reel until released therefrom, substantially in the manner described.

2,458.—COOKING STOVE.—Joseph C. Henderson, Albany, N. Y. Patented May 29, 1860. Reissued Jan. 30, 1863.

I claim, First, The employment of a supply chamber, e, separated from the combustion chamber, l, by means of the division plate, g, or any equivalent therefore, and each so arranged that the fresh fuel shall be fed at the side of the burning fuel, in the manner and substantially as and for the purposes described and set forth.

Second, I claim the combustion chamber, l, contracted at the top to prevent the too rapid escape of the gases of combustion, in combination with the supply chamber, e, substantially in the manner and for the purposes hereinbefore described and set forth.

Third, I claim the employment of the division plate or partition, g, or its equivalent so constructed and arranged as to divide the fire chamber or chamber of combustion and thereby constitute the chambers, l and e, in the manner and for the purposes substantially as herein described and set forth.

Fourth, I claim so constructing and arranging the said division plate, g, between said chambers, l and e, that atmospheric air may be admitted into and through it to the fire, so as to more perfectly consume the gases as they are evolved from the burning fuel, in the manner substantially as herein described and set forth.

Fifth, I claim the employment of the plate, p, for the purpose of retaining the gases in contact with the fire until they are entirely consumed, substantially as hereinbefore described and set forth.

Sixth, I claim constructing the said plate, p, in such a manner that air can be introduced through it to the surface of the fire, substantially as and for the purpose hereinbefore specified and set forth.

Seventh, I claim the supply chamber, e, combustion chamber, l, division plate, g, and plate, p, all combined and operating substantially in the manner and for the purposes hereinbefore specified and set forth.

Eighth, I claim the employment of the narrower contracted throat, q, when applied to cooking stoves or furnaces, in the manner and for the purposes substantially as herein described and set forth.

Ninth, I claim the employment of the supply chamber, e, when applied to cooking stoves or furnaces and therein constructed and arranged immediately in front of the combustion chamber, substantially in the manner and for the purposes as herein described and set forth.

2,459.—HEATING AND OTHER STOVES.—Joseph C. Henderson, Albany, N. Y. Patented May 29, 1860. Reissued June 30, 1863.

I claim, First, A reservoir or hopper contracted at its lower end to contain and supply fuel, in combination with a fire pot separate from said reservoir, and to which the coal is supplied at or near its center, so that the products of combustion pass away from the surface of the fire around the contracted base of the said hopper, substantially as specified.

Second, I claim a chamber or horizontal flue around the base of the reservoir or hopper supplying coal, and over the surface of the fire, to receive and detain the products of combustion in contact with the fire heat until perfectly consumed, substantially as herein fully described and set forth.

Third, I claim, a contracted outlet or opening from the said chamber or horizontal flue formed as aforesaid, to prevent a too rapid escape of the products of combustion, as specified and set forth fully hereinbefore.

Fourth, I claim the surrounding case, b, in combination with the said hopper, fire pot and chamber above the fire, for receiving the products of combustion from the said chamber and radiating heat, substantially as and for the purposes hereinbefore fully described and set forth.

Fifth, I claim, in combination with a hopper over the fire, a circulating current of air surrounding such hopper, to aid in cooling the fuel in said hopper, substantially as hereinbefore fully described and set forth.

Sixth, I claim the supply door, f, and register, e', in combination with the hopper, e, and draft space, g, substantially as herein described and set forth.

Seventh, I claim a circulating current of air passing through the hollow lower end of the supply hopper and entering the combustion chamber over the fire, for promoting combustion and keeping the hopper from injury by heat, as described and set forth.

2,460.—METHOD OF BRAKING AND STARTING STREET RAILWAY CARS.—Aaron Highley, South Bend, Ind. Patented Aug. 14, 1866.

First, I claim the construction and arrangement of the wheels, pullies levers, chains, and windlasses in their relation to each other, in the manner and for the purpose herein described.

Second, I claim the combination of the loose pulley, E E', and the loose clutch pulley, F and D'', with the clutch wheel D', which latter is rigidly attached to the axle, a, in the manner and for the purpose herein described.

2,461.—MEANS FOR OPERATING STAMPS AND HAMMERS.—Christopher R. James and Nathan W. Condeit, Jr., Jersey City, N. J., assignees of C. R. James. Patented June 19, 1866.

First, In combination with the steam cylinder of a hammer or stamp, a reservoir containing steam, compressed air or other aeriform fluid, of sufficient pressure to elevate the stamp but sensibly less than that of the steam in the boiler, when constructed, arranged and operating substantially as set forth.

Second, The arrangement in combination with two stamps or hammers, worked by pistons moving in separate cylinders, of the valve operated by said stamps or hammers in the manner described, with passages controlled by it, so arranged as to bring each cylinder alternately into communication with the boiler, and thereby produce the alternate action of the pistons and their attached stamps or hammers, essentially as herein set forth.

2,462.—LANTERN.—Eugene N. Jenkins, Chicago, Ill. Patented July 24, 1866.

I claim, First, The hand, D, provided with a plate or disk, E, for supporting the lantern globe, substantially as specified.

Second, The combination of the band, D, disk, E, springs, a, or ledges, c, with the base, C, substantially as and for the purposes specified.

Third, Extending the guard rods, F, and connecting them directly to the bottom or flanged part of an annular base having an opening in it sufficiently large to allow the globe to pass through it, substantially as set forth.

DESIGNS.

2,548.—HANDLE OF A SPOON OR FORK.—Henry H. Hayden, New York City, assignor to Holmes, Booth & Hayden, Waterbury, Conn.

2,549.—BOTTOM OF A FRYING PAN.—Henry D. Musselman, Lancaster, Pa.

2,550.—COPYING PRESS.—Joseph Naylor, Newark, N. J. Antedated Dec. 18, 1866.

2,551.—HANDLE OF A FORK OR SPOON.—Le Roy S. White, Waterbury, Conn.

2,552.—BURIAL CASE.—Martin H. Crane (assignor to Crane, Breed & Co.), Cincinnati, Ohio.

2,553.—MATCH SAFE.—Russel Frisbee (assignor to J. & E. Stevens & Co.), Cromwell, Conn.

2,554.—MOLDING.—Samuel Kellett, San Francisco, Cal.

2,555.—ROUND COMB.—W. S. Mingis, New York City.

2,556 and 2,557.—STANDARDS FOR SCHOOL FURNITURE.—Calvin W. Sherwood, Chicago, Ill.

2,558.—SCISSORS.—Samuel W. Valentine, Bristol, Conn.

2,559.—FLOWER GARDEN.—Wm. Webster, Rochester, N. Y.

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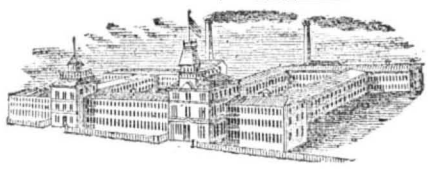

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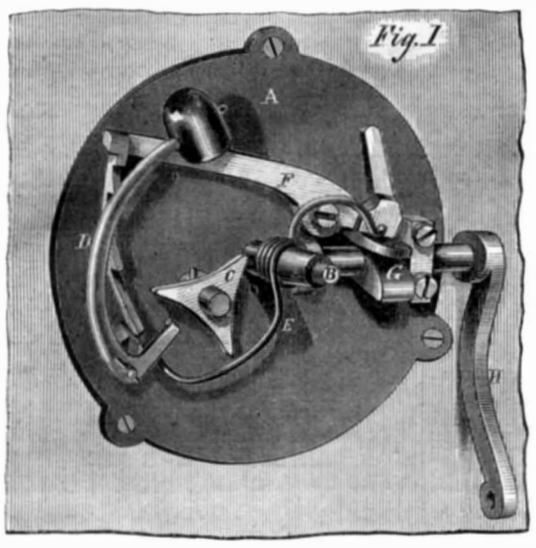
COLLINS AND SIMS' COMBINED DOOR BELL AND BURGLAR ALARM.

The engravings represent a device intended to act as an ordinary day alarm for visitors in place of the common door bell, and also as a means of notifying the inmates when the burglar attempts to unlawfully enter. Fig. 1 represents the mechanism, the bell being removed to show the parts. A, is

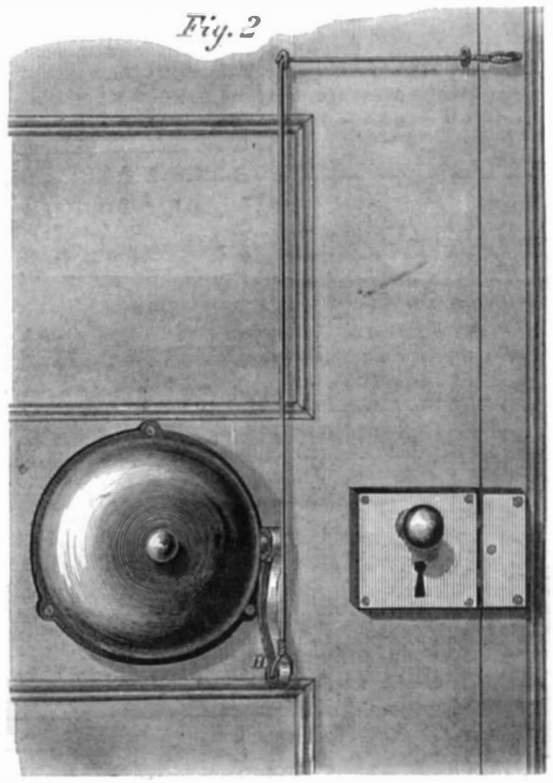
Fig. 1



a plate of metal to be secured to the inside of the door. The bell—the ordinary gong-shaped bell—is screwed on the center spindle, B. C is a cam secured to a shaft passing through the door, and fitted on the outside with an ornamental crank. When it is turned the points engage with the arm end of the hammer lever, D, bringing the hammer back toward the center of the plate for a blow. The spring, E, when the hammer is released from the cam, throws the hammer against the bell. This is the mechanism for the ordinary purposes of a door bell.

When, however it is to be used as a burglar alarm another device comes into play. The curved lever, F, is provided with notches at one end which are arranged so as to come in contact with the lower end of the hammer lever. This notched lever is operated by a cam, G, on the horizontal shaft which actuates the lever, F, against its short end, and depressing the notched end, brings the hammer back for a blow. To the shaft is attached a handle, H, which may be connected by a cord, or wire and hook to a staple on the door jamb, as in Fig. 2. It will be seen that if the door is then opened the handle, H, will be lifted and give an alarm by the bell.

Fig. 2



There appears to be nothing in this device liable to derangement or breaking. It is certainly simple enough to be durable. It was patented through the Scientific American Patent Agency, Nov. 20th, 1866 by D. L. Collins, or Elbridge Sims, Antwerp, N. Y., whom address for additional particulars.

THE WASTING OF COINS.

It is stated by an eminent English authority that the life of coins is much briefer now than before the introduction of steam for passenger travel. This is attributed to the almost constant attrition to which they are subjected by being carried about and the consequent passage of them from hand to hand. The authority we quote states that it takes on an average a hundred old shillings to make eighty new ones. This is a fearful waste, and as we expect some time to see gold and silver again a common medium of exchange in this country, it is of some importance to ascertain a remedy for the deterioration of coins. With copper and bronze coins it may be of no consequence, as they never bear intrinsically the value which they nominally possess, so that there is really no actual loss from wear. Gold and silver coins, however, are really worth their face or nominal value.

The method of manufacturing coins is opposed to their longevity. The plain disk is placed between the dies, as soft as the most perfect annealing can make it. When minted the recessed surface is hardened by compression, while the raised surfaces are left in a state very near that of their original softness. But these parts, unfortunately, are just those most exposed to attrition. The only remedy that suggests itself under these circumstances is a broad and projecting rim which, presenting less surface than the other figures, and being higher, would in a measure defend and protect them from rapid deterioration.

The Prussian Patent Law.

In our last number we discussed the defects of the Prussian patent system, and intimated that measures were in progress to improve it. We have since received a letter from the U.S. minister at Berlin, Hon. Jos. A. Wright, in answer to one we addressed to him on this subject in November last. He says the whole subject of patents in Prussia is practically under the direction of a Minister who changes and controls it from time to time as he sees fit. He also says that a gentleman is now preparing an act—or new law—for the "New North German Confederation" which will embrace all modern reforms such as will meet the requirements of the present time. Mr. Wright has given this subject considerable attention and deserves the thanks of his countrymen.

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